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## **The Xycoon Project**

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## **The Xycoon Project**

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## **Introduction**

The purpose of this working paper is to present a general description of the Xycoon Project and some detailed information about the use and the 'impact' of the Xycoon website and the linked Wessa.net facilities. The following aspects will be discussed or illustrated, i.e.

1. Purpose and Description of the Xycoon Project
2. Technology Employed by the Xycoon Project - General Overview
3. Some Notes About Search Ranks and Search Engines
4. Number of Visitors - Sample 1
5. Number of Visitors - Sample 2
6. Rank Order Attributed to the Website
7. Citations in Applications and Scientific Work
8. Final Discussion

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## 1. Purpose and Description of the Xycoon Project

The **Xycoon Project** is a privately funded network of websites aimed at making statistical science easily available through ‘web-enabled scientific services and applications’. The main websites are : **Xycoon.com**, **Wessa.net**, and **Time-Series-Analysis.com**. Various other websites are directly or indirectly related to the project - a few examples : sites concerned about the statistical measurement of web traffic, websites about statistical simulation of Stock Markets, and websites containing courses and course materials about statistics, econometrics, and time series analysis.

**Xycoon.com** (est. 2001) is a website that provides definitions, properties, proofs, and texts about a wide variety of statistical topics including (but not limited to) : matrix algebra, basic econometrics, linear regression (OLS and MLE), regression extensions (autocorrelation, heteroskedasticity, multicollinearity, nonlinearity, simultaneity, misspecification), mathematical models in econometrics, Box-Jenkins time series analysis, descriptive statistics (box plots, central tendency, correlations, density trace, histograms, kurtosis, concentration, moments, partial correlations, quartiles, rank correlations, simple linear regression, skewness, variability), continuous distributions (Beta, Inverted Beta, Cauchy 1, Cauchy 2, Chi, Chi Square 1, Chi Square 2, Erlang, Exponential, Fisher, Gamma, Inverted Gamma, Gumbel, Laplace, Logistic, Lognormal, Normal, Pareto, Power, Rayleigh, R, Uniform, Student, Triangular, Weibull), and statistical hypothesis testing. The name Xycoon does not have any meaning. It is just a short name that can easily be remembered.

**Wessa.net** (est. 2003) is an inter-related collection of free online software applications for the purpose of: mathematical equation plotting (incl. function analysis, numerical integration & derivation), multiple regression (incl. many diagnostics), a wide selection of descriptive statistics (see Xycoon.com), hypothesis testing, sample size, financial computations, Box-Jenkins time series analysis, many robustness diagnostics for time series, bootstrap simulation of profit densities for various types of parameterized trading strategies, database of historical financial time series (updated daily), etc... The name Wessa is an abbreviation of ‘**Web-Enabled Scientific Services and Applications**’. At the same time it is the family name of the author of the online software.

**Time-Series-Analysis.com** (est. 2004) is a community-driven collection of weblinks, free datasets, free software, free source code and algorithms about Statistics, Econometrics, and Time Series Analysis (Univariate and Multivariate Forecasting).

The network is hosted on a system of various servers located around the world. The operational costs are financed through e-commerce, advertising, and publishing. All services and applications are free of charge for non-commercial use.

A ‘network’ of integrated websites enables the creation of many types of educational and research-oriented applications that would never be possible with stand-alone software and traditional (journal) papers. To better understand the importance of the network, we shortly discuss two examples, based on real experiences, where the Xycoon Project plays a role of particular importance.

### Example 1: Xycoon Exchange

Each year, the European Commission (Directorate General of ‘Environment’) organizes a Green Week conference about a wide range of environmental issues. The Sustainability of the Stock Market was one of the key topics in the 2004 edition of the Green Week. We were asked by the Commission to create a realistic simulation of the Stock Market where investors have the choice between equity of ‘sustainable’ versus ‘ordinary’ companies. The simulation was based on two components of the Xycoon Project :

1. Xycoon Exchange which is based on a Stock Market Transaction Handling System that was originally developed for creating real-life online exchanges and simulations.
2. The Wessa.net software that was used to compute typical reactions of financial markets with respect to news-related impulses.

Based on a set of real stock price time series we created a large number of scenarios of news-related market reactions. This led to the development of an Artificial Intelligence Engine that models ‘normal’

market reactions to news messages that have been written within the context of sustainability issues (such as the environment, and social working conditions).

With all of these components we then created a Stock Market Simulation Game that was used at the Green Week event in June 2004 (European Commission's News Flash 1 and 4).

Xycoon Exchange is also used in Education where it provides the opportunity to statistically analyze the stock market time series that are the result of the interaction of participants (mostly students). The stock price time series can be instantly analyzed with several Wessa.net tools in real-time. All computations that are performed in the statistical software contain links to the Xycoon.com website where the statistical concepts or formulas are defined.

### **Example 2: A Statistics Course**

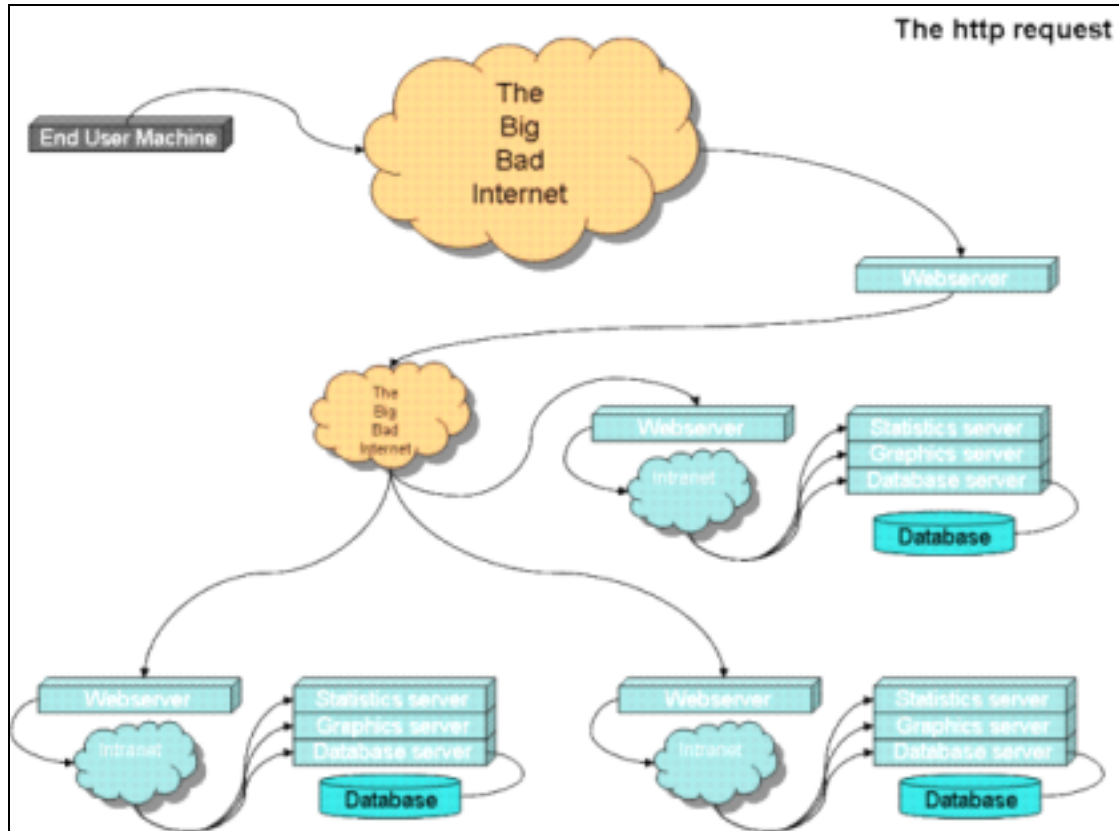
A master-level Time Series Analysis course was created based on an open source Virtual Learning Environment called Moodle (<http://www.moodle.org/>). Most resources in this course are directly linked to the Xycoon.com website.

During the semester, students have to perform a series of 11 research-related workshops based on simulated and real, economic time series. For this purpose the Wessa.net software and Time-Series-Analysis.com website have been seamlessly integrated into Moodle (students login to Moodle, and have instant access to both websites within a private, dedicated workspace). In addition, the educator obtains detailed statistics about how individual students make use of all the integrated components. This provides important statistical information on student behavior which can be statistically analyzed with the Wessa.net software. In the end this information leads to a better understanding of on-line behavior of our users which in turn leads to numerous improvements of the software and the structure of the website. Within the context of this Statistics Course, an article is being prepared on the relationship between student attitudes, Peer-Assessment of workshops, and final examination scores. The article is to be submitted to an open access Journal in the near future.

## 2. Technology Employed by the Xycoon Project - General Overview

The Xycoon Project is not a static website but a network of interconnected, interactive web services hosted on a system of geographically distributed servers.

**Figure 1 : The http Request**



In a first stage the initial http request is received by the main webserver where it is redirected to one or several computational servers. The redirection algorithm is based on the estimated amount of computational effort to be performed, and various types of workload statistics. The result of the computations is returned to the original sender's browser in the form of html code and/or binary graphics, mostly in png format. This explanation is greatly simplified and only meant to provide a rough idea about how the underlying technology works.

The use of this technology brings about some very important advantages in comparison with 'ordinary' Download-Install-and-Execute (DIE) software :

- there are no downloads (no applets, no scripts, no executables). Therefore there are no installation problems and the management/support of different versions is greatly simplified. Upgrades, bug fixes, and restoration of backups are quickly and cheaply performed. Another nice advantage is the fact that the use of this system is 100% secure (there is no danger of infecting the home computer with viruses)
- there are no compatibility problems. The user interface is created with standard html and all communication between users and servers is handled through (secure) http. In other words, every user with an internet connection and a 'normal' browser is able to use all the features that are made available through this system
- the server software can be ported to (almost) any platform: the server code is written in ANSI C. This allows to make use of relatively cheap, dedicated hosting solutions. In other words, the exploitation costs can be greatly reduced
- issues related to scalability and performance can be solved by the redirection algorithm that routes requests to servers with excess capacity

On the other hand, the technology that is employed in the Xycoon Project also raises a few questions about possible problems :

- there is some additional overhead in the administration of several servers. An obvious example is the synchronization of the databases at different hosting locations
- operational costs must be financed through income of e-commerce, advertising, and publishing
- computer-intensive algorithms (such as profit/risk simulation of financial investment strategies) may consume large amounts of resources: some computations take a few minutes or even several hours to perform

To solve the first problem a synchronization tool called 'rsync' is used which works very well under various platforms (including Linux and Windows).

Despite our 'open access' philosophy, the project is self-sustaining. If there is any surplus it is re-invested into the project in terms of additional hardware and outsourcing of certain software components for system maintenance purposes.

An example of such a component is the Online Queue Manager which solves the third problem (the so-called 'load balancing' problem) and is currently beta-tested. The final release is expected in February 2006.

### 3. Some Notes About Search Ranks and Search Engines

In order to better understand the information of the following sections, we provide a few notes and reflections about how Search Engines work and how Search Ranks are determined.

First and foremost we assume that Google is the most important - if not 'dominant' - search engine on the internet. There is no hard evidence to sustain this assumption but we believe that many - if not most - webmasters or website owners would agree that, based on their logfile statistics, Google is the search engine that sends them most visitors. In the remainder of this paper, we make this assumption, without prejudice with respect to any other form of search or any other search engine.

When someone submits a search phrase in Google, the resulting page contains an ordered list of webpages. The order in which the results are displayed is very important and is called Search Rank. By default, only the first 10 webpages are displayed on the result page. It is obvious that well-ranked pages get more visitors than pages with a poor rank. Search Rank can be interpreted in terms of importance or relevance. Google uses a very complicated, secret algorithm to determine how important webpages are with respect to search terms. The Search Rank may be influenced by factors such as :

- the number of citations (inbound links) from other well-ranking websites
- the actual content and format of the webpage
- the number and/or quality of outbound links
- the website's structure (incl. internal links)

An interesting quote may help to understand the philosophy employed by Google to achieve search results :

*'Does Google ever manipulate its search results?*

*The order and contents of Google search results are completely automated. No one hand picks a particular result for a given search query, nor does Google ever insert jokes or send messages by changing the order of results. Occasionally, when a particular website is the subject of public attention, other sites begin linking to it. This may elevate its importance as gauged by our ranking software, which assigns a Page Rank value based in part on who links to a given page. Higher ranking in Google results may lead to more awareness, which may lead to more links and so on.*

*One side effect of not using an editorial viewpoint to determine the ranking of results is that anomalies occasionally occur. We view such occasions as opportunities for us to learn more about how the web works and how to improve our algorithms for all searches in the future.'*

<http://www.google.com/support/bin/answer.py?answer=4115&topic=368>

The concept of Page Rank received a lot of attention in the internet community. Unlike the many unfounded, speculative or even funny articles, e.g. <http://www.google.com/technology/pigeonrank.html>, the following references may provide a more thorough description of Page Rank and its computation :

- the original Page Rank paper by Google's founders **Sergey Brin** and **Lawrence Page** that can be found on <http://www-db.stanford.edu/~backrub/google.html>
- **Phil Craven**'s article on <http://www.webworkshop.net/pagerank.html>

The bottom line is that Google does not allow website owners to pay for high search ranks. Google uses automatic algorithms to measure the quality of a webpage's content. One of the key factors used to discriminate between 'authority' content and 'rubbish' is based on inbound links from other authorities. At first sight this may look much like the way how citations are used to determine Impact Factors in academic publications. There is however a fundamental difference : Page and Search Rank cannot be influenced by self- or cross-citation.



#### 4. Number of Visitors - Sample 1

In order to describe the number of visitors two datasets will be used. The first one consists of the daily number of users for the period starting in July 2003 and ending in January 2005. The exact specification of this first sample can be summarized by Table 1.

**Table 1 : Sample 1 - Specification**

<b>Subject</b>	Number of Visitors
<b>Period</b>	Tuesday 15/07/2003 - Saturday 15/01/2005 From day 196 in 2003 until day 15 in 2005
<b>Sample size</b>	551 Observations 170+366+15 = 551 days
<b>Location</b>	Worldwide

The log files prior to Tuesday 15 July 2003 were inconsistent – we omitted them from the sample. The end date has been determined by the first day that we started to collect data about the Xycoon Project with the intention to write this working paper. Even though, traffic statistics have increased substantially since that day, we have two good reasons to exclude more recent data in this paper :

1. the computation of various types of statistics based on web server log files can be very time-consuming (some aspects even involve thorough manual research)
2. the sample is large enough for the purpose of providing an idea about the impact of the Xycoon Project on the internet

The total number of visitors during this 551 days period was more than seven million. The average number of visitors per time interval is presented in Table 2.

**Table 2 : Sample 1 - Number of Visitors**

<b>Period</b>	<b>Total</b>	<b>Averages</b>
<b>Sample Period</b>	7 032 540	
<b>Year</b>		4 658 579.12
<b>Month</b>		388 214.93
<b>Day</b>		12 763.23
<b>Hour</b>		531.80
<b>Minute</b>		8.86

The visitors can be categorized by using the internet's domain-name system (DNS). This system allows the user to refer to websites by using easier-to-remember domain names rather than the all-numeric IP addresses assigned to each computer hooked on the internet. The right-most label of the domain name is referred to as the top-level domain (TLD).

Within the DNS there are several types of TLD names. The two main types of TLD's are :

- **Country-Codes (ccTLDs)**  
Over 240 countries and external territories are characterized by TLDs composed by a two-letter code
- **Generic TLDs (gTLDs)**  
The main gTLDs and their purpose can be found in Table 3.

There is one special TLD, named '.arpa', which is used for technical infrastructure purposes.

To get a more precise idea about the geographical penetration of the use of the Xycoon website the visitors during the 551 day period were categorized by using their domain names. It turned out that the total number of TLD's represented by the sample was 170. The complete list of these domains can be found in Appendix 1. The information of Appendix 1 can be summarized by Table 4.

**Table 3 : Main gTLDs**

TLD	Purpose
.arpa	Address and Routing Parameter Area domain
.biz	Business - Not much used
.com	Commercial registrants
.edu	Reserved for United States educational institutions
.gov	Reserved for agencies of the United States government
.info	Unrestricted use - Not much used
.int	Reserved for organizations established by international treaties between governments
.mil	Reserved for the United States military
.net	Intended for network providers
.org	Originally intended for use by non-profit organizations

**Table 4 : Sample 1 - Geographical Penetration and Significance**

Domain	Total	Sample 1
gTLDs	16	10
ccTLDs (°)	248	160
<i>UN Members</i>	<i>191</i>	<i>144</i>
<i>UN Non Members</i>	<i>57</i>	<i>16</i>

(°) Including the .eu domain (European Union)

In Table 4 three specific characteristics of the obtained number of domain names are put in evidence. The first and minor characteristic is the distinction between the gTLDs and the ccTLDs. The second characteristic is the comparison of the number of ccTLDs with the official number of members of the United Nations. The last and perhaps the most important characteristic is the comparison of the numbers obtained from the sample with the maximum attainable numbers.

From this table the following conclusions can be drawn :

- besides the fact that 10 out of the 16 existing gTLDs, i.e. 62.5%, are represented in the sample it can be seen from Appendix 1 that they include the most important domains as well (such as .com, .net, .org, .edu, .gov, .mil)
- the 160 ccTLDs from the sample stand for 64.5% of the 248 available country codes
- from the 191 official members of the United Nations 144 are represented in the sample, which is 75.4%
- 10% of the ccTLD's of the sample represents geographical (smaller) regions that are even not members of the United Nations

Based on the available information provided by this first sample we conclude that the geographical penetration of the use of the Xycoon website is at least remarkable.

**Table 5 : Sample 1 - General Statistics - Wessa.net Output**

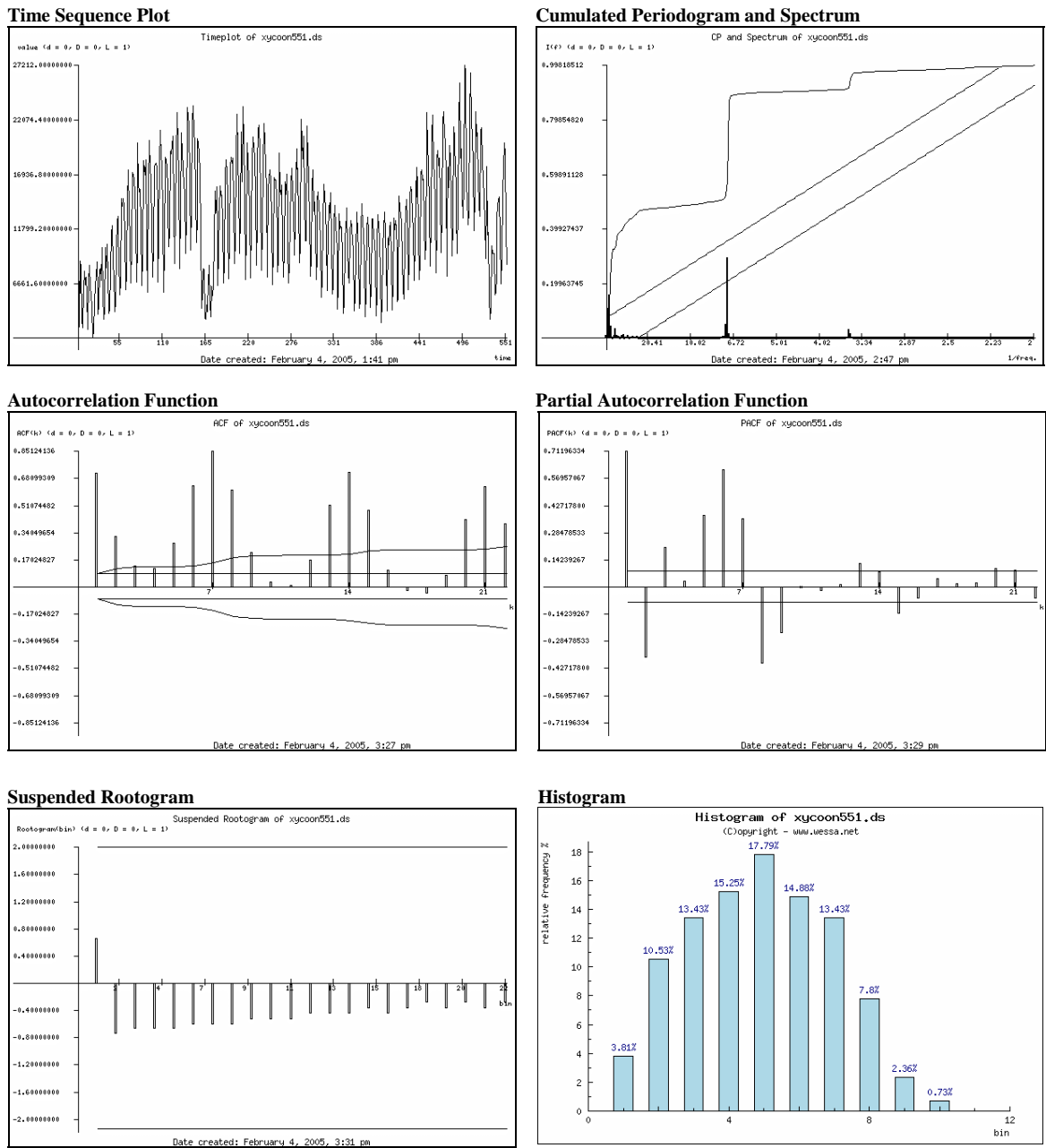
xycoon551.ds by time (d = 0, D = 0, Lambda = 1)	
Number of observations	551
# lost observations	0
Median of Time Series	12624
2 Sided Trimmed Mean at 5%	12698.307692308
2 Sided Trimmed Mean at 10%	12693.718181818
2 Sided Trimmed Mean at 15%	12700.375
Mean of Time Series	12763.230490018
SE of Mean of Time Series	222.19714294514
T-STAT of Mean of Time Series	57.441019811714
SE of Time Series	5210.9849052882
Minimum value of Time Series	1524
Maximum value of Time Series	27212

In the previous paragraphs the prime interest was the geographical location of the visitors. In contrast to the spatial dimension of the information provided by the first sample in the next paragraphs more attention will be paid to the number of visitors irrespective of their origin.

As a first step we can use the general statistics given in Table 5. From these statistics the following preliminary conclusions can be formulated :

- since the difference between the mean and the median is rather small relative to the standard error of the mean the distribution will be fairly symmetric
- the relative small effect of trimming is an additional argument for a symmetric distribution
- however, since the mean is slightly larger than the median a moderate right skewed distribution of the daily number of visitors can be expected

**Figure 2 : Sample 1 - Graphical Representations - Wessa.net Output**



Referring to the specification of this first sample, as mentioned in Table 1, all conditions<sup>1</sup> seem to be met to treat this dataset as a regular time series. By using the appropriate graphical representations some important characteristics of the series can be illustrated. For this purpose Figure 2 was constructed. This figure is composed by the following graphs : Time Sequence Plot, Cumulated Periodogram with Spectrum, Autocorrelation and Partial Autocorrelation Function and Suspended Rootogram. A visual inspection of these graphs leads to the following conclusions :

- the number of visitors shows a highly cyclical pattern with a double seasonality, i.e. a daily and a monthly cycle
- the long term cyclical pattern is interrupted by a sharp drop of the traffic during a two-week period centered around New Year
- even for a time span of only 18 months the long term trend is definitely positive

A last remark can be made about the histogram. As can be seen from the graph the tentative and preliminary conclusions about the distribution of the daily visits that were based on general statistics are confirmed.

**Table 6 : Sample 1 - Peculiar Results**

	<b>Date</b>	<b>Visitors</b>	<b>Remark</b>
<b>Monday</b>	<b>22/11/2004</b>	27 212	Maximum
<b>Tuesday</b>	<b>02/08/2003</b>	1 524	Minimum
<b>Thursday</b>	<b>25/12/2003</b>	3 348	Christmas
<b>Wednesday</b>	<b>31/12/2003</b>	4 676	December 31
<b>Thursday</b>	<b>01/01/2004</b>	3 540	January 1
<b>Saturday</b>	<b>25/12/2004</b>	3 300	Christmas
<b>Friday</b>	<b>31/12/2004</b>	5 608	December 31
<b>Saturday</b>	<b>01/01/2005</b>	5 860	January 1

One might wonder what the traffic was at holidays or days with a traditional low economic and educational activity. As an example the number of visitors for Christmas, New Year's Eve and New Year's Day is given in Table 6. The results are quite surprising. During these days the recorded number of visitors to the site appears to be rather low, but is still a multiple of the absolute minimum obtained during the sample period occurring on Tuesday 02/08/2003.

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<sup>1</sup> The data are consistent (without missing values), and may be regarded as an equi-distant time series.

## 5. Number of Visitors - Sample 2

To get an even more precise idea about the exact profile of the visitors to the Xycoon website a second sample was used. The specification of this second sample is given by the following Table 7.

**Table 7 : Sample 2 - Specification**

<b>Subject</b>	Number of Visitors
<b>Period</b>	19/01/2005
<b>Sample size</b>	One hour period between 12:00 and 01:00 pm 1000 Observations
<b>Location</b>	First 1000 visitors during the period Time Zone GMT-5

The day that this sample was drawn is arbitrary. It is important however to know that 19 January 2005 was a mid-week day (Wednesday). This implies that typical visitors-at-work are to be expected in the sample - this is our primary target group with the Xycoon Project.

The hour period was chosen based on the knowledge that most (targeted) users live in the U.S. and in Europe. During the hour that was chosen there is traditionally a lot of activity in both regions.

The main purpose of this second sample is to try to identify each of the thousand visitors. To illustrate the problems involved with the identification process Table 8 can be used.

**Table 8 : Sample 2 - Sample Composition**

Domain	TLD	Entries
Arpanet	.arpa	1
Commercial	.com	153
Educational US	.edu	98
Networks	.net	164
Organizations	.org	9
US Government	.gov	5
US Dept. of Defense	.mil	6
ccTLDs		327
IP Addresses		237
<b>Total</b>		<b>1000</b>

In Table 8 the thousand visitors are categorized by using the name of the domain of the visitor. It can be seen that for almost 24% of these visitors the only help in the identification consists of an IP address of the user. Despite of all the technical difficulties<sup>2</sup> in tracing the users we succeeded in identifying 574 visitors, i.e. 57.4% of the sample items. The identified cases are categorized in Table 9.

**Table 9 : Sample 2 - Identified Sample Items**

Group	Entries
<b>Educational</b>	325
<b>Non-Educational</b>	229
<b>Extension .gov</b>	5
<b>Extension .mil</b>	6
<b>Extension .org</b>	9
<b>Total</b>	<b>574</b>

<sup>2</sup> The technical difficulties have to do with the very nature of internet technology. For example, every single user of America Online (AOL) sends http requests with several different IP addresses. On the other hand, many users of Belgium's Telenet may share the same 'outside-visible' IP address (of their local proxy server) when they visit a website. In other words, we cannot simply count IP addresses, and we have to take into account a variety of 'visible' properties that are recorded by the web server.

The identified non-educational users were further divided in 18 categories. To a large extent the categorization is artificial and even ambiguous. A few examples can illustrate the difficulties involved. A company categorized as a producer of pharmaceuticals will also be involved in the supporting research. Many telecommunication companies will also act as an internet provider and vice versa. Special attention should be paid to the visitors labeled as internet provider. It is evident that the true end-users will be 'hidden' behind the identified provider. The final result of the categorization of the 229 non-educational visitors can be found in Table 10.

**Table 10 : Sample 2 - Identified Non-Educational Visitors - Categories**

Category	Entries
1. Chemicals	2
2. Consulting	6
3. Energy	4
4. Engineering	3
5. Financial	38
6. Government	30
7. Healthcare	5
8. Insurance	10
9. Internet Provider	37
10. Manufacturing	23
11. Marketing & Retailing	8
12. Network Technology	4
13. Pharmaceuticals	5
14. Real Estate	1
15. Research	18
16. Software	3
17. Telecommunication	28
18. Transportation	4
<b>Total</b>	<b>229</b>

**Table 11 : Sample 2 - Identified Educational & Non-Educational Visitors - Countries**

Country	Edu.	Non Edu.	Total
Algeria		1	1
Argentina		1	1
Australia	6	6	12
Austria	3		3
Belgium	7	6	13
Brazil	4	1	5
Canada	25	7	32
Chile		1	1
China		1	1
Colombia		1	1
Croatia	1		1
Cyprus		1	1
Czech Republic	4		4
Denmark	2	7	9
Dominican Republic		1	1
Finland	4	7	11
France	13	3	16
Germany	16	2	18
Greece	1		1
Hong Kong	3	3	6
Hungary		2	2
Iceland		1	1
India	3	11	14
Indonesia	1		1
Iran		2	2
Ireland	9	1	10
Israel	1	1	2
Italy	3	5	8
Japan	6	2	8
Kenya	1		1
Korea	4	4	8
<b>Total</b>	<b>325</b>	<b>229</b>	<b>554</b>

Country	Edu.	Non Edu.	Total
Luxembourg		1	1
Malaysia		3	3
Mexico	1	1	2
Netherlands	7	7	14
New Zealand	1		1
Nigeria		3	3
Norway	3	1	4
Pakistan		1	1
Philippines	1	2	3
Poland	2		2
Puerto Rico	1		1
Romania	3	1	4
Russia	1	2	3
Singapore	1	1	2
Slovak Republic	1	1	2
Slovenia		1	1
South Africa		1	1
Spain	8	1	9
Sri Lank	2		2
Sweden	4	2	6
Switzerland	8	4	12
Taiwan		2	2
Thailand	3		3
Trinidad & Tobago		1	1
Turkey	1	1	2
United Ar. Em.		1	1
United Kingdom	45	17	62
United States	115	93	208
Venezuela		1	1
Zimbabwe		2	2
<b>Total</b>	<b>325</b>	<b>229</b>	<b>554</b>

The 325 educational users as well as the 229 non-educational visitors are also split up by country. The results can be found in Table 11. Especially for the non-educational users the identification of the country was not always straightforward. For multinationals in general and more in particular for companies located at several sites the exact identification of the country of the visitor might not always be evident.

All the available information about each of the 574 identified visitors can be found in three Appendices, i.e. Appendix 2 for 325 educational visitors, Appendix 3 for 229 non-educational visitors and Appendix 4 for the visitors identified by the domain names .gov, .org and .mil.

Apart from the diversity of the identified users the following general remarks can be made :

- the total number of countries involved is 61
- given the timing of the sample, i.e. about noon for the time zone GMT-5, a large number of users could be identified for locations outside the conventional local business hours

As far as impact on the academic world is concerned, Appendix 1 speaks for itself. In addition, the Appendices 2 and 3 suggest that our project also provides an impact on important public and private organizations world wide.

## 6. Rank Order Attributed to the Website

Measuring the attractiveness or the popularity of a website is not trivial. One of the more promising approaches is to use Search Rank (the rank order attributed to the site by one of the search engines). Highly relevant webpages tend to have a higher Search Rank than other pages. Also, top-ranked pages get more visitors than others. Therefore Search Rank is not only a measure for attractiveness or relevance but also a good measure for the market share of visitors one might attract. This so-called Traffic Share is always a relative measure for traffic: as one might imagine the population of internet users with an active interest in statistics is by far outnumbered by the population with an interest in Britney Spears.

Given the fact that web servers store visitor information about the search phrase that was used to reach a site, we have used the following method to compute Search Rank statistics :

- an arbitrary selection was made among the top 100 key phrases entered for a search by Google
- for each of these key phrases the total number of references and the relative position of the Xycoon website was recorded
- for the purpose of comparison, the rank order obtained by the well-known website of Mathematica (<http://www.wolfram.com>) was recorded too

The results for 28 general key phrases are tabulated in Table 12. The same method was applied to 12 key phrases that were relevant for the Wessa.net site, i.e. the module where the actual calculations are performed. These results can be found in Table 13.

**Table 12 : Rank Order of Links to the Xycoon Site (°)**

Key Phrases	References	Rank	
	Total	Xycoon	Mathematica
Arima Models	94 100	3	-
Autocorrelation	445 000	7	1
Beta Distribution	7 270 000	2	1
Box Jenkins	1 180 000	5	-
Coefficient of Determination	1 130 000	2	-
Coefficient of Variation	1 600 000	3	-
Econometrics	1 630 000	9	-
Erlang Distribution	82 300	1	3
Frequency Table	12 200 000	6	-
Gamma Distribution	2 790 000	8	2
Geometric Mean	1 360 000	7	1
Gini Coefficient	106 000	10	3
Gumbel Distribution	28 700	3	2
Heteroskedasticity	164 000	2	-
Interquartile Range	118 000	5	1
Lognormal Distribution	128 000	7	4
Matrix Algebra	2 060 000	7	-
Mean Absolute Deviation	1 020 000	1	2
Multiple Regression Model	2 020 000	7	-
Ordinary Least Squares	537 000	1	-
Pareto Distribution	214 000	4	1
Quartiles	269 000	4	-
Rayleigh Distribution	241 000	2	1
Statistical Distributions	2 280 000	1	7
Triangular Distribution	500 000	2	1
Unit Root	5 440 000	1	-
Weibull Distribution	129 000	5	6
Weighted Mean	2 230 000	2	9

(°) Recorded : Search Engine Google  
: Only the first ten references were used  
: 05/02/2005 between 03:15 and 03:30 pm



**Table 13 : Rank Order of Links to the Wessa.net Site (°)**

<b>Key Phrases</b>	<b>References Total</b>	<b>Rank Xycoon</b>
<b>Equation Plotter</b>	37 700	1
<b>Forecasting Software</b>	1 640 000	5
<b>Free Statistics Software</b>	12 900 000	1
<b>Linear Regression Software</b>	890 000	1
<b>Mathematical Equation</b>	2 640 000	1
<b>Multiple Regression</b>	2 340 000	14
<b>Multiple Regression Software</b>	930 000	3
<b>Quartiles</b>	269 000	18
<b>Skewness</b>	408 000	9
<b>Skewness Kurtosis</b>	110 000	2
<b>Skewness Software</b>	67 500	1
<b>Statistics Software</b>	17 200 000	8

(°) **Recorded** : Search Engine Google  
: Only the first twenty references were used  
: 07/02/2005 between 07:30 and 07:40 am

Even though the ranking results only provide a temporary or ‘snapshot’ view, the following conclusions can be formulated :

- given the total number of references by Google for the given 40 key phrases, the rank order obtained for both the Xycoon and the Wessa.net site are at least more than satisfactory
- results of the comparison with the performance of the worldwide successful commercial Mathematica software were totally unexpected

## 7. Citations in Applications and Scientific Work

A last approach to illustrate the importance or the ‘impact’ of the Xycoon Project is to look for applications and scientific work using and citing our work. For the period 2002-2005 a total of 42 references could be traced where the Xycoon Project was cited in documents other than web pages. In other words, hyperlinks that point to one of the Xycoon websites and are found on a website of a scientific journal (such as The Royal Economic Society, ‘The Econometrics Journal Online’, <http://www.econ.vu.nl/econometriclinks/software.html>) is excluded from the list of citations. Only documents that are related to an application or scientific work that exists outside the World Wide Web is taken under consideration. The reason for this self-imposed limitation is the fact that we intend to demonstrate the impact of our work in traditional applications such as: published journals, course materials, presentations, manuals, technical reports, software, etc...

Full information about each of these references can be found in Appendix 5. From the summary provided in Table 14 one can conclude that these references are characterized by :

- geographical penetration
- diversity of treated subjects
- various types of documents

**Table 14 : Characteristics of Citations in Applications and Scientific Work**

Characteristic	Categories
<b>Country</b>	Australia, Brazil, Canada, China, Czech Republic, Finland, France, Germany, Greece, Iceland, Israel, Italy, Japan, Norway, Poland, Spain, Sweden, Switzerland, Taiwan, Tajikistan, The Netherlands, United Kingdom, United Nations, United States
<b>Type of Publication</b>	Consulting Report, Course Materials & Lecture Notes, Doctoral Thesis, Master’s Degree Project, Minutes Teleconference, Online Article, Paper, PowerPoint Presentation, Refereed & International Journal Article, Research Report, Software Manual, Survey Report, Technical Report
<b>Subject</b>	Agronomics - Phytotechnics, Animal Ecology, Applied Mathematics, Bioinformatics, Biomass, Business Forecasting, Computer Science - Neural Networks, Cost-Benefit Analysis, Data Warehousing & Data Mining, Econometrics, Economics, Energy Research, Engineering & Operations Research, Geology, Marketing, Metal Processing, Modeling & Simulation, Molecular Biology, Pharmacy, Public Affairs & Policy, Radar Design & Operations, Rural Development, Software, Statistical Theory, Survey Analysis

Table 15 shows how citations (received by the Xycoon Project) are distributed among various types of uses.

**Table 15 : Citations of Different Publications - Broken Down by Type of Use**

Category	Type of Use	Citing Publications		
		# Unique No Doubles	# Indexed Google Scholar	# Versions
<b>Non-academic</b>	Consulting Reports, Jakarta, UN Report	3	0	0
<b>Education</b>	Course Materials, Lecture Notes, Slides	10	0	0
<b>Research</b>	Papers & Reports	8	3	5
	Master Theses	5	1	1
	PhD Theses	3	2	6
	Software Manuals	4	0	0
	Articles in Peer-Reviewed, International Journals	6	5	21

Even though the sample of citations is (too) small for statistical analysis purposes, it is still interesting to look at Table 15. It gives a rough indication about how the Xycoon Project is used, based on citations in publications (other than pure html). Note that most educational citations of Xycoon are purely html based. The number of such citations (c.q. hyperlinks) is very large, and is virtually impossible to manually count and rigorously verify.

Table 15 shows that, with the exception of Master theses and research software, many research-related publications that cite the Xycoon Project are themselves indexed by Google Scholar<sup>3</sup>. Even though educational and non-academic publications are not (themselves) indexed in Google Scholar, they are cited in other indexed publications.

3 out of 8 research papers and 2 of 3 PhD theses are indexed in Google Scholar. However we found (at least) 8 indexed publications that had citations to the research papers and no less than 9 (indexed) citations of the PhD documents. Articles in Peer-Reviewed, International Journals are widely spread in the Google Scholar index (there are at least 21 versions of the 5 articles in the index). One article is still under review which explains why it is not in the Google Scholar index.

From Table 15 we conclude that most of the research-related publications that have citations of the Xycoon Project may themselves be called ‘scholarly publications’. This means that the citations received by Xycoon have ‘impact’ on the academic community.

Another way to measure the importance of citations to the Xycoon Project in scholarly Journals is to use the Impact Factor. The Impact Factor of Journal X in year t can be computed based on the following information :

1. A = the number of citations Journal X receives in year t for articles that are published in years (t-1) and (t-2)
2. B = the total number of citable articles in years (t-1) and (t-2)

The Impact Factor in year t is simply A/B. This can be interpreted as the average (expected) number of citations an article in Journal X gets within a two-year period. It is important to interpret this number with great care because citations received within a Journal are not uniformly distributed. Highly cited articles contribute towards the Journal’s Impact Factor, whereas a substantial number of other articles may never be cited at all. Therefore, if one uses the Impact Factor of a Journal as an estimate of the citations that an article (published in that same Journal) receives, it is obvious that important (highly cited) articles are unjustly downgraded, while the importance of other articles is over-estimated.

To use the words of the ‘incites’ website (which is an editorial component of ISI Essential Science Indicators) :

‘Since citation frequency is highly skewed, with many infrequently cited papers and relatively few highly cited papers, average citation rates should not be interpreted as representing the central tendency of the distribution, but rather as guidelines or benchmarks’. ([http://in-cites.com/ESI Product Info/1-Baselines.htm](http://in-cites.com/ESI_Product_Info/1-Baselines.htm), 25/11/2005 - 09:40 pm)

**Table 16 : Papers Published in Mathematics - Average Citation Rates - Period : 1994-2004 (°)**

Years	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	All
Citation Rates	4.97	4.63	4.32	3.77	3.27	2.92	2.22	1.57	1.01	0.41	0.06	2.55

(°) <http://in-cites.com/analysis/04-fifth-math.html#Highly%20Cited%20Papers>  
25/11/2005 - 09:41 pm

Table 16 shows that the scholarly publications (indexed in the ISI Science Indicator) in Mathematics have very low average citation rates. Clearly, the Xycoon Project performs much better than what would be expected on the basis of this Average Citation Rate.

Note, that the citation distribution is highly skewed. Instead of using averages we should think in terms of distributions. The use of percentiles is a convenient way to represent skewed distributions. Again we cite the ‘incites’ website about how citation percentiles should be interpreted:

<sup>3</sup> ‘Google Scholar provides a simple way to broadly search for scholarly literature. From one place, you can search across many disciplines and sources: peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, preprint repositories, universities and other scholarly organizations. Google Scholar helps you identify the most relevant research across the world of scholarly research’.  
<http://scholar.google.com/scholar/about.html> - 24/11/2005 - 01:09 am

'The distribution of citations over papers is highly skewed, approximating a power law distribution, with relatively many infrequently cited papers and few highly cited papers. One method for making a selection is to rank papers in descending order by citation frequency, and select the top fraction of papers. The percentile table shows the citation count threshold for four different percentile cuts for each field and year, as well as all fields. For example, a threshold of 44 citations for 1993 papers in astrophysics will select about 1 percent of the 1993 papers in the astrophysics journal set'. ([http://in-cites.com/ESI\\_Product\\_Info/1-Baselines.htm](http://in-cites.com/ESI_Product_Info/1-Baselines.htm) - 25/11/2005 - 09:40 pm)

**Table 17 : Papers Published in Mathematics - Percentiles - Period : 1994-2004 (°)**

Percentiles	Years											All
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
0.01 %	320	597	307	139	97	141	85	57	82	56	8	213
0.10 %	125	168	115	76	67	57	37	27	20	9	4	73
1.00 %	46	40	38	32	27	24	17	13	9	5	2	25
10.00 %	13	12	11	10	9	8	6	5	3	2	1	7

(°) <http://in-cites.com/analysis/04-fifth-math.html#Highly%20Cited%20Papers>  
25/11/2005 - 09:41 pm

Table 17 shows that the Xycoon Project would need about 5 citations in ISI-indexed publications to be in the top 1% of all publications in Mathematics over a time span of two years. Note, that we do not have the actual 2005 figures available - therefore we use the 2003 column which shows how many citations are needed to be in the top 0.01%, 0.10%, 1.00%, or 10.00% of all Mathematics publications at the end of a two-year period, considering the fact that the above table was computed in early 2005. Even if there are no new citations in the next three years, our project would still be in the top 10%.

**Table 18: Citations from Peer-Reviewed, International Journals with Impact Factor**

Universities & Support	Article	Journal	Impact Factor
Department of Mathematics and School of Computational Science, Florida State University	On the Expected Optimal Value and the Optimal Expected Value	Applied Mathematics and Computation (°)	0.567 (2004)
1. University of Minnesota, Twin Cities 2. University of Minnesota Digital Technology Center, Minnesota Supercomputing Institute 3. Army High Performance Computing Research Center 4. National Science Foundation	Parameter Estimation for Spatial Autoregression Model : A Rigorous Approach	IEEE Transactions on Knowledge and Data Engineering (2005)	1.223 (2003)
1. Microsoft Research Asia 2. Electrical and Computer Engineering, University of Massachusetts 3. National Science Foundation	Cost-Based Cache Replacement and Server Selection for Multimedia Proxy Across Wireless Internet	IEEE Transaction on Multimedia (2004)	1.450 (2003)
1. Department of Biology, University of York 2. Department of Animal and Plant Sciences, University of Sheffield,	The Lognormal Distribution Is Not an Appropriate Null Hypothesis for the Species-Abundance Distribution	Journal of Animal Ecology (2005)	3.342 (2004)
1. Molecular Modelling and Bioinformatics Unit, Institut de Recerca Biomèdica 2. Institute for Mathematics, Swiss Federal Polytechnical Institute 3. Departament de Fisicoquímica, Facultat de Farmàcia, Universitat de Barcelona 4. Departament de Bioquímica i Biologia Molecular, Facultat de Química, Universitat de Barcelona	The Relative Flexibility of B-DNA and A-RNA Duplexes : Database Analysis	Nucleic Acids Research (2004)	7.26
1. Max-Planck-Institut für Chemie 2. Massachusetts Institute of Technology 3. Department of Geological Sciences, Rutgers University	Lead isotopes reveal bilateral asymmetry and vertical continuity in the Hawaiian mantle plume	Nature (2005)	13.5 (2004)
Number of Citations			6
Sum of Impact Factors (Weighted Citations)			27.342

(°) Preprint. This article has not yet been accepted for publication. The information is based on a preprint of 15/07/2005.

The sheer number of citations a publication receives does not tell the whole story about its importance or 'impact'. There may be many reasons for this :

- self-citations and cross-citations may have a substantial effect on the impact measure
- citations from high impact Journals may be considered to be more important than citations from low impact Journals (also high impact Journals might have a much smaller relative self-citation bias than low impact Journals)
- some may attribute a value to other properties that are not related to the Journal (research group of the authors, the research subject, etc...)
- some might argue that citations from a wide variety of fields (multidisciplinary citations) values more than citations from only one field (monodisciplinarity)
- sometimes it is argued that citations from researchers in different geographical regions is more important than citations within a particular region

In Table 18 we present citations that the Xycoon Project received from Peer-Reviewed, International Journals. Only those citations that could be traced with the use of Google, and those that could be verified in a full-text examination of the actual article have been reported. In addition, various types of information about the citation (such as the academic institutions that are involved in the research or funding, and the Journal's Impact Factor) have been included.

Since we did not have the actual Impact Factors for every Journal we used the next available year as an estimate. In these cases the year of the Impact Factor is included between brackets.

We conclude from Table 18 that the Xycoon Project has an 'impact' on the academic research community. The citations are of a multidisciplinary nature, and involve Journals with a high impact factor : the distribution of Impact Factors is - just as for individual articles - highly skewed which implies that many Journals have virtually no impact, while a relatively small number have Impact Factors greater than 1.

## 8. Final Discussion

The impact of the Xycoon Project on the international, academic and scientific community was demonstrated by the use of various types of data. The information provided in this paper is not exhaustive but illustrative. Still there is an overwhelming amount of evidence that the Xycoon Project provides added value to the academic world in a variety of ways that would never have been achieved through the use of traditional means of communication. In addition, several purely quantitative measures of impact (such as numbers of visitors, and citations from journals with high impact factor) reveal the usefulness and quality of our work - at least as it is perceived by academic researchers.

The strategy we employ to communicate our work is based on the open access model. This implies that everyone (with internet access) is free to use our work and cite it in documents or in other websites. Our success in terms of Search Rank is determined by the number (and quality) of 'authority websites' that link to our websites. Receiving links and citations depends on content and service, not on the number of publications. This is, in our view, the most important factor that provides trust in our work which is a *conditio sine qua non* for any scientist (or other user) to cite our work in other (non-html) documents. Our strategy is by no means the standard today, but we believe it will be in the (near) future.

Future plans for the project are ambitious but nevertheless realistic and very tangible. With the proper support from one or two academic institutions we could create a large, high-impact, educational and research-oriented network of web-based publications and applications.

**Appendix 1 : Domain Names from Sample 1**

Domain	TLD	Domain	TLD	Domain	TLD
Albania	.al	Great Britain	.gb	Pakistan	.pk
Algeria	.dz	Greece	.gr	Palestinian Territories	.ps
Andorra	.ad	Guam	.gu	Panama	.pa
Antigua and Barbuda	.ag	Guatemala	.gt	Papua New Guinea	.pg
Argentina	.ar	Guyana	.gy	Paraguay	.py
Armenia	.am	Honduras	.hn	Peru	.pe
Aruba	.aw	Hong Kong	.hk	Philippines	.ph
Australia	.au	Hungary	.hu	Poland	.pl
Austria	.at	Iceland	.is	Portugal	.pt
Azerbaijan	.az	India	.in	Puerto Rico	.pr
Bahamas	.bs	Indonesia	.id	Qatar	.qa
Bahrain	.bh	Info domain	.info	Romania	.ro
Bangladesh	.bd	International	.int	Russian Federation	.ru
Barbados	.bb	Iran	.ir	Rwanda	.rw
Belarus	.by	Ireland	.ie	Saint Kitts & Nevis Anguilla	.kn
Belgium	.be	Israel	.il	Saint Lucia	.lc
Belize	.bz	Italy	.it	Saint Vincent & Grenadines	.vc
Bermuda	.bm	Jamaica	.jm	Samoa Islands	.ws
Bhutan	.bt	Japan	.jp	Saudi Arabia	.sa
Biz domain	.biz	Jordan	.jo	Senegal	.sn
Bolivia	.bo	Kazakhstan	.kz	Singapore	.sg
Bosnia-Herzegovina	.ba	Kenya	.ke	Slovak Republic	.sk
Botswana	.bw	Kuwait	.kw	Slovenia	.si
Brazil	.br	Kyrgyzstan	.kg	South Africa	.za
British Indian Ocean Territory	.io	Laos	.la	South Korea	.kr
Brunei Darussalam	.bn	Latvia	.lv	Spain	.es
Bulgaria	.bg	Lebanon	.lb	Sri Lanka	.lk
Burkina Faso	.bf	Lesotho	.ls	Sudan	.sd
Cambodia	.kh	Libya	.ly	Swaziland	.sz
Cameroon	.cm	Lithuania	.lt	Sweden	.se
Canada	.ca	Luxembourg	.lu	Switzerland	.ch
Chile	.cl	Macau	.mo	Syria	.sy
China	.cn	Macedonia	.mk	Taiwan	.tw
Cocos (Keeling) Islands	.cc	Malawi	.mw	Tanzania	.tz
Colombia	.co	Malaysia	.my	Thailand	.th
Commercial	.com	Malta	.mt	Tonga	.to
Costa Rica	.cr	Mauritius	.mu	Trinidad and Tobago	.tt
Croatia	.hr	Mexico	.mx	Tunisia	.tn
Cuba	.cu	Moldova	.md	Turkey	.tr
Cyprus	.cy	Monaco	.mc	Uganda	.ug
Czech Republic	.cz	Mongolia	.mn	Ukraine	.ua
Denmark	.dk	Morocco	.ma	United Arab Emirates	.ae
Dominican Republic	.do	Mozambique	.mz	United Kingdom	.uk
Ecuador	.ec	Myanmar	.mm	United States	.us
Egypt	.eg	Namibia	.na	Uruguay	.uy
El Salvador	.sv	Nepal	.np	USA Educational	.edu
Estonia	.ee	Netherlands	.nl	USA Government	.gov
Ethiopia	.et	Netherlands Antilles	.an	USA Military	.mil
European Union	.eu	Network	.net	Uzbekistan	.uz
Faroe Islands	.fo	New Caledonia (French)	.nc	Vanuatu	.vu
Fiji	.fj	New Zealand	.nz	Venezuela	.ve
Finland	.fi	Nicaragua	.ni	Vietnam	.vn
Former USSR	.su	Nigeria	.ng	Virgin Islands	.vi
France	.fr	Non-Profit Organizations	.org	Yugoslavia	.yu
Georgia	.ge	Norway	.no	Zambia	.zm
Germany	.de	Old style Arpanet	.arpa	Zimbabwe	.zw
Gibraltar	.gi	Oman	.om	Total Entries	170

## Appendix 2 : Sample 2 - Educational Visitors

### Australia - Entries : 6

**Australian National University** : Canberra - Australia  
**Australian National University** : Canberra - Australia  
**Charles Darwin University** : Darwin - Australia  
**The University of Melbourne** : Melbourne - Australia  
**The University of Melbourne** : Melbourne - Australia  
**University of Canberra** : Australian Academic & Research Libraries - Canberra - Australia

### Austria - Entries : 3

**The Innsbruck Universities** : Leopold-Franzens-University - Innsbruck Medical University - Innsbruck - Austria  
**The Innsbruck Universities** : Leopold-Franzens-University - Innsbruck Medical University - Innsbruck - Austria  
**Virtueller Campus Graz** : Karl-Franzes- Universität - Kunstuniversität - Medizinische Universität - Technische Universität - Graz - Austria

### Belgium - Entries : 7

**Katholieke Universiteit Leuven** : Leuven - Belgium  
**Katholieke Universiteit Leuven** : Universitaire Ziekenhuizen Leuven - Leuven - Belgium  
**Limburg University Centre** : Rekencentrum - Diepenbeek - Belgium  
**Université Catholique de Louvain** : Lovain-la-Neuve - Belgium  
**Université Catholique de Louvain** : Unité de Génie Biologique - Louvain-la-Neuve - Belgium  
**Université de Liège** : Liège - Belgium  
**University of Ghent** : Ghent - Belgium

### Brazil - Entries : 4

**Universidade de Sao Paulo** : Sao Paulo - Brazil  
**Universidade Estadual Campinas** : Campinas - Sao Paulo - Brazil  
**Universidade Federal de Minas Gerais** : Belo Horizonte - Brazil  
**Universidade Federal do Rio Grande do Sul** : Instituto de Informática - Porto Alegre - Brazil

### Canada - Entries : 25

**Concordia University** : Montreal - QC - Canada  
**École Polytechnique de Montréal** : Université de Montréal - Montréal - QC - Canada  
**Grant MacEwan College** : Edmonton - AB - Canada  
**McGill University** : Department of Mathematics and Statistics - Montreal - QC - Canada  
**McMaster University** : Electrical & Computer Engineering - Hamilton - ON - Canada  
**Memorial University of Newfoundland** : Department of Biology - St. John's - NL - Canada  
**SAIT** : Southern Alberta Institute of Technology - Calgary - AB - Canada  
**Simon Fraser University** : Burnaby - BC - Canada  
**The University of British Columbia** : Vancouver - BC - Canada  
**University of Alberta** : General Services Building - Edmonton - AB - Canada  
**University of Calgary** : Calgary - AB - Canada  
**University of Guelph** : Guelph - ON - Canada  
**University of Manitoba** : Winnipeg - MB - Canada  
**University of New Brunswick** : Fredericton - NB - Canada  
**University of Saskatchewan** : Saskatoon - SK - Canada  
**University of Saskatchewan** : Saskatoon - SK - Canada  
**University of Saskatchewan** : Saskatoon - SK - Canada  
**University of Saskatchewan** : Saskatoon - SK - Canada  
**University of Toronto** : Toronto - ON - Canada  
**University of Toronto** : Toronto - ON - Canada  
**University of Western Ontario** : Faculty of Engineering - London - ON - Canada  
**University of Western Ontario** : London - ON - Canada  
**University of Western Ontario** : London - ON - Canada  
**University of Western Ontario** : London - ON - Canada  
**University of Western Ontario** : The Department of Statistical and Actuarial Sciences - London - ON - Canada

### Croatia - Entries : 1

**Croatian Academic and Research Network** : Zagreb - Croatia

### Czech Republic - Entries : 4

**Charles University Prague** : Faculty of Mathematics and Physics - Prague - Czech Republic  
**University of Economics** : Faculty of Management - Prague - Czech Republic  
**University of South Bohemia** : Agricultural Faculty : Ceske Budejovice - Czech Republic  
**University of West Bohemia** : Faculty of Applied Sciences - Pilsen - Czech Republic

### Denmark - Entries : 2

**IT University of Copenhagen** : Copenhagen - Denmark  
**University of Copenhagen** : Department of Medical Biochemistry and Genetics - Copenhagen - Denmark



**Finland - Entries : 4**

**Helsinki Polytechnic Stadia** : Helsinki - Finland  
**Helsinki School of Economics** : Helsinki - Finland  
**Helsinki University of Technology** : Helsinki - Finland  
**University of Tampere** : Tampere - Finland

**France - Entries : 13**

**École Sainte Marie** : Corbeil Essonnes - France  
**Institut de Chemie des Substances Naturelles** : Gif-sur-Yvette - France  
**Institut National de Recherche en Informatique et Automatique** : Rocquencourt - France  
**Pôle Universitaire Léonard de Vinci** : Courbevoie - France  
**Université Blaise Pascal** : Institut Supérieure d'Informatique de Modélisation et leurs Applications - Clermont-Ferrand - France  
**Université d'Évry** : Évry - France  
**Université d'Avignon** : Institut Universitaire Professionnalis  - G nie Math matique et Informatique - Avignon - France  
**Universit  de Haute Alsace** : Mulhouse & Colmar - France  
**Universit  de Technologie de Compi gne** : Compi gne - France  
**Universit  des Sciences et Technologies de Lille** : Lille - France  
**Universit  Lille 3** : Centre de Ressources Informatiques - Villeneuve d'Ascq - France  
**Universit  Paris 7 - Denis-Diderot** : Paris - France  
**Universit  Toulouse 1** : Sciences Sociales - Toulouse - France

**Germany - Entries : 16**

**Albert-Ludwigs-Universit t Freiburg** : Department of Pharmacology and Toxicology - Freiburg - Germany  
**Bayerischen Akademie der Wissenschaften** : Leibnitz-Rechenzentrum - M nchen - Germany  
**European University Viadrina** : Frankfurt an der Oder - Germany  
**European University Viadrina** : Frankfurt an der Oder - Germany  
**Fraunhofer Institut Informations- und Datenverarbeitung** : M nchen - Germany  
**Georg-August-Universit t** : Mathematische Fakult t - Centre for Statistics - G ttingen - Germany  
**Justus-Liebig-Universit t Gießen** : Fachbereich Psychologie - Gießen - Germany  
**Klinikum der Christian-Albrechts-Universit t zu Kiel** : Rechenzentrum des Klinikums - Kiel - Germany  
**Max-Planck-Institute for Molecular Genetics** : Berlin - Germany  
**Rheinische Friedrich-Wilhelms-Universit t Bonn** : Landwirtschaftliche Fakult t - Institut f r Agrarpolitik, Marktforschung und Wirtschaftssoziologie - Bonn - Germany  
**Ruprecht-Karls-Universit t Heidelberg** : Heidelberg - Germany  
**Universit t Karlsruhe** : Karlsruhe - Germany  
**Universit t Konstanz** : Sozialwissenschaftliche Fakult t - Fachbereich Psychologie - Konstanz - Germany  
**Universit t Leipzig** : Fakult t f r Mathematik und Informatik - Department of Computer Science - Leipzig - Germany  
**Universit t Leipzig** : Fakult t f r Mathematik und Informatik - Institut f r Informatik - Leipzig - Germany  
**Westf lische Wilhelms-Universit t M nster** : M nster - Germany

**Greece - Entries : 1**

**Aristotle University of Thessaloniki** : Department of Electrical & Computer Engineering - Thessaloniki - Greece

**Hong Kong - Entries : 3**

**The Chinese University of Hong Kong** : Hong Kong - China  
**The Hong Kong Polytechnic University** : Hong Kong - China  
**The University of Hong Kong** : Hong Kong - China

**India - Entries : 3**

**Indian Institute of Technology** : Department of Computer Science and Engineering - Delhi - India  
**Indian Institute of Technology** : North Campus Network - Kharagpur - India  
**Maharashtra Cosmopolitan Education Society** : Pune - India

**Indonesia - Entries : 1**

**Institut Teknologi** : Bandung - Indonesia

**Ireland - Entries : 9**

**Dublin City University** : Dublin - Ireland  
**Dublin City University** : School of Computing - Dublin - Ireland  
**Limerick Institute of Technology** : Limerick - Ireland  
**National University of Ireland** : Engineering Hydrology - Galway - Ireland  
**National University of Ireland** : Galway - Ireland  
**Tipperary Institute** : Thurles - Ireland  
**University College** : Dublin - Ireland  
**University College Cork** : Cork - Ireland  
**University of Dublin** : Trinity College - Department of Computer Science - Dublin - Ireland

**Israel - Entries : 1**

**Weizmann Institute of Science** : Rehovot - Israel

**Italy - Entries : 3**

**Scuola Superiore Sant'Anna di Studi Universitari e di Perfezionamento** : Pisa - Italy  
**Università degli Studi di Cassino** : Facoltà di Ingegneria - Cassino - Italy  
**Università degli Studi di Firenze** : Facoltà di Scienze Matematiche, Fisiche e Naturali - Firenze - Italy

**Japan - Entries : 6**

**Chuo University** : Tokyo - Japan  
**Kyoto University** : Kyoto - Japan  
**Ritsumeikan Asia Pacific University** : Kyoto - Japan  
**Toyohashi University of Technology** : Machine Dynamics Laboratory - Toyohashi - Japan  
**University of Tokyo** : Institute of Industrial Science - Tokyo - Japan  
**Waseda University** : Tokyo - Japan

**Kenya - Entries : 1**

**Methodist University** : Nairobi - Kenya

**Korea - Entries : 4**

**Electronics and Telecommunications Research Institute** : Korea  
**Gwangju Institute of Science and Technology** : Gwangju - Korea  
**Korea University** : Seoul - Korea  
**Korea University** : Seoul - Korea

**Mexico - Entries : 1**

**Technológico de Monterrey** : Monterrey - Mexico

**Netherlands - Entries : 7**

**Delft University of Technology** : Delft - Netherlands  
**Delft University of Technology** : Faculteit Techniek en Geowetenschappen - Delft - Netherlands  
**Noordelijke Hogeschool Leeuwarden** : Leeuwarden - Netherlands  
**UMC - Universitair Medisch Centrum St Radboud** : Nijmegen - Netherlands  
**Universitair Medisch Centrum St Radboud** : Nijmegen - Netherlands  
**Universiteit Utrecht** : Geowetenschappen - Utrecht - Netherlands  
**Wageningen University** : Wageningen - Netherlands

**New Zealand - Entries : 1**

**University of Auckland** : School of Engineering - Department of Computer Science - Software Engineering Programme - Auckland - New Zealand

**Norway - Entries : 3**

**Norwegian University of Science and Technology** : Faculty of Information Technology, Mathematics and Electrical Engineering - Department of Mathematical Science - Trondheim - Norway  
**Norwegian University of Science and Technology** : Faculty of Natural Sciences and Technology - Department of Physics - Trondheim - Norway  
**University of Tromsø** : Det Medisinske Fakultet - Tromsø - Norway

**Philippines - Entries : 1**

**University of the Philippines** : Manila - Philippines

**Poland - Entries : 2**

**University of Information Technology & Management** : Rzeszow - Poland  
**Warsaw University** : Faculty of Economic Sciences - Warsaw - Poland

**Puerto Rico - Entries : 1**

**University of Puerto Rico** : Rio Piedras - Puerto Rico

**Romania - Entries : 3**

**Al. I. Cuza University** : Faculty of Economics and Business Administration - Iasi - Romania  
**RoEduNet** : Romanian Education Network - Bucharest - Romania  
**University Politehnica of Bucharest** : Bucharest - Romania

**Russia - Entries : 1**

**Moscow State University** : Skobeltsyn Institute of Nuclear Physics - Moscow - Russia

**Singapore - Entries : 1**

**National University of Singapore** : Singapore

**Slovak Republic - Entries : 1**

**Comenius University** : Department of Applied Mathematics and Statistics - Bratislava - Slovak Republic

**Spain - Entries : 8**

**Universidad de Granada** : Granada - Spain

**Universidad de Navarra** : Centro de Tecnología Informática - Pamplona - Spain

**Universidad de Navarra** : Centro de Tecnología Informática - Pamplona - Spain

**Universidad de Salamanca** : Salamanca - Spain

**Universidad Pontificia Comillas** : Escuela Técnica Superior Ingeniera - Instituto de Investigación Tecnológica - Madrid - Spain

**Universidade Federal de Sao Carlos** : Sao Carlos - Spain

**Universitat Politècnica de Valencia** : Valencia - Spain

**Universitat Pompeu Fabra** : Barcelona - Spain

**Sri Lanka - Entries : 2**

**Rajarata University of Sri Lanka** : Faculty of Applied Science - Colombo - Sri Lanka

**University of Moratuwa** : Lanka Educational, Academic and Research Network - Department of Computer Science and Engineering - Moratuwa - Sri Lanka

**Sweden - Entries : 4**

**Linköpings Universitet** : Department of Computer and Information Science - Linköping - Sweden

**Royal Institute of Technology** : Department of Electrical Engineering - Stockholm - Sweden

**Umea Universitet** : Ekologi och Geovetenskap - Umea - Sweden

**University of Stockholm** : Statistika Institutionen - Stockholm - Sweden

**Switzerland - Entries : 8**

**École Polytechnique Fédérale de Lausanne** : Lausanne - Switzerland

**École Polytechnique Federale de Lausanne** : Lausanne - Switzerland

**Eidgenössische Technische Hochschule Zürich** : Zürich - Switzerland

**Eidgenössische Technische Hochschule Zürich** : Zürich - Switzerland

**Eidgenössische Technische Hochschule Zürich** : Zürich - Switzerland

**Eidgenössische Technische Hochschule Zürich** : Zürich - Switzerland

**Eidgenössische Technische Hochschule Zürich** : Zürich - Switzerland

**SWITCH** : Swiss Academic and Research Network : Zürich - Switzerland

**Thailand - Entries : 3**

**Asian Institute of Technology** : Bangkok - Thailand

**Asian Institute of Technology** : Pathumthani - Thailand

**Chulalongkorn University** : Centers of Academic Resources - Bangkok - Thailand

**Turkey - Entries : 1**

**University of Istanbul** : Faculty of Science - Department of Physics - Istanbul - Turkey

**United Kingdom - Entries : 45**

**Birkbeck University** : London - United Kingdom

**Imperial College** : Department of Bioengineering - London - United Kingdom

**Imperial College** : Faculty of Medicine - London - United Kingdom

**Imperial College** : London - United Kingdom

**Keele University** : Newcastle-under-Lyme - United Kingdom

**King's College London** : London - United Kingdom

**Lancaster University** : Lancaster - United Kingdom

**Lewisham College** : London - United Kingdom

**London School of Economics and Political Science** : London - United Kingdom

**London School of Economics and Political Science** : London - United Kingdom

**London School of Economics and Political Science** : London - United Kingdom

**Loughborough University** : Loughborough - United Kingdom

**Napier University** : Edinburgh - United Kingdom

**Richmond Adult Community College** : London - United Kingdom

**Southampton Institute** : University College - Southampton - United Kingdom

**The University of Edinburgh** : Edinburgh - United Kingdom

**The University of Edinburgh** : The School of Engineering and Electronics - Edinburgh - United Kingdom

**The University of Manchester** : Manchester - United Kingdom

**The University of Sheffield** : Department of Computer Science - Sheffield - United Kingdom

**University of Bath** : Bath - United Kingdom

**University of Birmingham** : Birmingham - United Kingdom

**University of Birmingham** : Birmingham - United Kingdom

**University of Bristol** : Department of Engineering Mathematics - Bristol - United Kingdom

**University of Bristol** : Department of Mathematics - Bristol - United Kingdom

**University of Bristol** : Department of Mathematics - Bristol - United Kingdom

**University of Cambridge** : Churchill College - Cambridge - United Kingdom

**University of Cambridge** : Gonville & Caius College - Cambridge - United Kingdom

**University of Dundee** : Tayside Centre for General Practice - Dundee - United Kingdom

**University of Durham** : Durham - United Kingdom

**University of East Anglia** : Norwich - United Kingdom  
**University of East Anglia** : School of Environmental Sciences - Norwich - United Kingdom  
**University of Essex** : Colchester - United Kingdom  
**University of Glamorgan** : School of Computing - Pontypridd - United Kingdom  
**University of Glamorgan** : School of Computing - Pontypridd - United Kingdom  
**University of Glasgow** : Glasgow - United Kingdom  
**University of London** : St George's Hospital Medical School - London - United Kingdom  
**University of Newcastle upon Tyne** : Newcastle - United Kingdom  
**University of North London** : London - United Kingdom  
**University of Nottingham** : Nottingham - United Kingdom  
**University of Oxford** : Mathematical Institute - Oxford - United Kingdom  
**University of Plymouth** : Plymouth - United Kingdom  
**University of Southampton** : Southampton - United Kingdom  
**University of Strathclyde** : Glasgow - United Kingdom  
**University of Ulster** : Londonderry & Belfast - United Kingdom  
**Wadham College** : Oxford - United Kingdom

<b>United States - Entries : 115</b>
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**Arizona State University** : TeleComm Services - Tempe - AZ - US  
**Baylor College of Medicine** : Houston - TX - US  
**California State University** : Los Angeles - CA - US  
**California State University at Hayward** : Hayward - CA - US  
**Carleton College** : Northfield - MN - US  
**Carnegie Mellon University** : Pittsburgh - PA - US  
**Case Western Reserve University** : Cleveland - OH - US  
**CHA - Connecticut Hospital Association** : Wallingford - CT - US  
**College of Medicine** : Mayo Clinic - Rochester - MN - US  
**Colorado State University** : Department of Computer Science - Fort Collins - OK - US  
**Colorado State University** : Fort Collins - CO - US  
**Colorado State University** : Fort Collins - CO - US  
**Cornell University** : Civil & Environmental Engineering - Ithaca - NY - US  
**Cornell University** : Ithaca - NY - US  
**Dartmouth College** : Hanover - NH - US  
**Duke University** : Durham - NC - US  
**East Tennessee State University** : Johnson City- TN - US  
**Florida Atlantic University** : Department of Mathematical Sciences - Boca Raton - FL - US  
**Florida State University** : Tallahassee - FL - US  
**Georgia College and State University** : Milledgeville - GA - US  
**Georgia Institute of Technology** : Atlanta - GA - US  
**Georgia Institute of Technology** : Atlanta - GA - US  
**Georgia Institute of Technology** : Georgia Tech Research Institute - Atlanta - GA - US  
**Georgia Institute of Technology** : School of Psychology - Atlanta - GA - US  
**Georgia State University** : Atlanta - GA - US  
**Harvard University** : Cambridge - MA - US  
**Harvard University** : Faculty of Arts and Sciences - Cambridge - MA - US  
**Howard University** : Washington - DC - US  
**Indiana University** : Bloomington - IN - US  
**Indiana University** : Bloomington - IN - US  
**Indiana University** : Bloomington - IN - US  
**Jackson State University** : Jackson - MS - US  
**Kansas State University** : Computing and Network Services - Manhattan - KS - US  
**Massachusetts Institute of Technology** : Cambridge - MA - US  
**Michigan State University** : East Lansing - MI - US  
**New York University** : New York - NY - US  
**Northeastern University** : Division of Academic Computing - Boston - MA - US  
**Northwestern University** : Department of Mechanical Engineering - Evanston - IL - US  
**Oakland University** : Rochester - MI - US  
**Ohio State University** : Columbus - OH - US  
**Ohio State University** : Columbus - OH - US  
**Ohio University** : Athens - OH - US  
**Oklahoma State University** : Stillwater - OK - US  
**Old Dominion University** : Norfolk - VA - US  
**Old Dominion University** : Norfolk - VA - US  
**Penn State University** : Hershey Medical Center - State College - PA - US  
**Penn State University** : University Park - PA - US  
**Polytechnic University** : MetroTech Center - Brooklyn - NY - US  
**Portland Community College** : Portland - OR - US  
**Princeton University** : Princeton - NJ - US  
**Princeton University** : Princeton - NJ - US  
**Purdue University** : College of Science - Department of Statistics - West Lafayette - IN - US  
**Purdue University** : Department of Agricultural Economics - West Lafayette - IN - US  
**Rockefeller University** : New York - NY - US  
**St. Petersburg College** : St. Petersburg - FL - US  
**Stanford University** : Stanford - CA - US  
**Stanford University** : Stanford - CA - US  
**Stanford University** : Stanford - CA - US  
**Stanford University** : Stanford - CA - US  
**Stanford University** : Stanford - CA - US  
**Syracuse University** : Syracuse - NY - US  
**Temple University** : Philadelphia - PA - US  
**The College of William & Mary** : Williamsburg - VA - US

**United States Air Force Academy** : Colorado Springs - CO - US  
**United States Air Force Academy** : Colorado Springs - CO - US  
**University of Arizona** : Department of Electrical and Computer Engineering - Tucson - AZ - US  
**University of California at Berkeley** : Visual Processing Laboratory - Berkeley - CA - US  
**University of California at Davis** : Davis - CA - US  
**University of California at Irvine** : Irvine - CA - US  
**University of California at Irvine** : Network and Academic Computing Services - Irvine - CA - US  
**University of Colorado** : Boulder - CO - US  
**University of Florida** : Center for Instructional and Research Computing Activities - Gainesville - FL - US  
**University of Florida** : Gainesville - FL - US  
**University of Florida** : Gainesville - FL - US  
**University of Florida** : Institute of Food and Agricultural Sciences - Gainesville - FL - US  
**University of Florida** : University Medical Center - Gainesville - FL - US  
**University of Illinois Urbana-Champaign** : Department of Electrical and Computer Engineering - Urbana - IL - US  
**University of Kentucky** : Math Sciences - Lexington - KY - US  
**University of Maryland** : College Park - MD - US  
**University of Maryland** : Office of Information Technology - College Park - MD - US  
**University of Michigan** : Ann Arbor - MI - US  
**University of Michigan** : Ann Arbor - MI - US  
**University of Michigan** : IT Communications Services - Ann Arbor - MI - US  
**University of Minnesota - Twin Cities** : Minneapolis - MN - US  
**University of Minnesota** : Duluth - MN - US  
**University of Minnesota** : Natural Resources Research Institute - Duluth - MN - US  
**University of New Orleans** : New Orleans - LA - US  
**University of North Carolina at Greensboro** : Greensboro - NC - US  
**University of North Carolina at Greensboro** : Greensboro - NC - US  
**University of Notre Dame** : South Bend - IN - US  
**University of Oregon** : Eugene - OR - US  
**University of Pittsburgh** : Pittsburgh - PA - US  
**University of Pittsburgh** : Pittsburgh - PA - US  
**University of Pittsburgh** : School of Engineering - Institute of Industrial Engineers - Pittsburgh - PA - US  
**University of Richmond** : Richmond - VA - US  
**University of South Carolina** : Computer Services Division - Columbia - SC - US  
**University of South Florida** : Tampa - FL - US  
**University of Southern California** : Los Angeles - CA - US  
**University of Southern Maine** : Portland - ME - US  
**University of Texas** : Health Science Center at Houston - Houston - TX - US  
**University of Texas at Dallas** : Dallas - TX - US  
**University of Texas at El Paso** : Department of Electrical & Computer Engineering - El Paso - TX - US  
**University of Utah** : Department of Pharmacology & Toxicology - Salt Lake City - UT - US  
**University of Washington** : Seattle - WA - US  
**University of Washington** : Seattle - WA - US  
**Vidor Independent School District** : Vidor - TX - US  
**Virginia Polytechnic Institute and State University** : Department of Economics - Blacksburg - VA - US  
**Virginia Polytechnic Institute and State University** : Virginia-Maryland Regional College of Veterinary Medicine - Blacksburg - VA - US  
**Washington University in St. Louis** : St. Louis - MO - US  
**West Virginia University** : Telecommunications Department & Network Services - Morgantown - WV - US  
**Whitworth** : Spokane - WA - US  
**Wilkes University** : Mathematics & Computer Science Department - Wilkes - Barre - PA - US  
**Yale University** : School of Medicine - Yale-New Haven Medical Center - New-Haven - CT - US  
**Yale University** : School of Medicine - Yale-New Haven Medical Center - New Haven - CT - US  
**Youngstown State University** : Beeghly College of Education - Youngstown - OH - US

## Appendix 3 : Sample 2 - Non-Educational Visitors

### Category 1 : Chemicals - Entries : 2

**AKZO NOBEL** : *Chemicals* - Netherlands  
**Tioxide Group PLC** : *Chemicals* - United Kingdom

### Category 2 : Consulting - Entries : 6

**Accenture** : *Consulting* - Switzerland  
**Accenture** : *Consulting* - US  
**Association for Project Management** : *Consulting - Project Management* - United Kingdom  
**Deloitte Touche** : *Consulting* - United Kingdom  
**LECG** : *Consulting* - US  
**Satyam Infoway Limited** : *Consulting* - India

### Category 3 : Energy - Entries : 4

**Allegheny Energy Service Corporation** : *Energy - Energy Delivery* - US  
**British Energy** : *Energy - Electricity Production* - United Kingdom  
**El Paso Corporation** : *Energy - Natural Gas* - US  
**National Iranian Oil Company** : *Energy - Oil* - Iran

### Category 4 : Engineering - Entries : 3

**Areté Associates - Airborne Remote Optical Spotlight System** : *Engineering - Defence* - US  
**Bechtel Group** : *Engineering* - US  
**R.W. Beck & Associates** : *Engineering* - US

### Category 5 : Financial - Entries : 38

**Abaxbank Investement Bank** : *Financial* - Italy  
**ABN AMRO Bank** : *Financial* - Netherlands  
**ABN AMRO Bank** : *Financial* - Netherlands  
**Banco de la República** : *Financial* - Colombia  
**Bank of New York** : *Financial* - US  
**Bank One - JPMorgan Chase & Co.** : *Financial* - US  
**Bank One - JPMorgan Chase & Co.** : *Financial* - US  
**Citibank** : *Financial* - US  
**Citibank** : *Financial* - US  
**Citibank** : *Financial* - US  
**Commerzbank** : *Financial* - Germany  
**Danmarks Nationalbank** : *Financial* - Denmark  
**DeepGreen Bank** : *Financial* - US  
**Euroclear** : *Financial* - Belgium  
**Fidelity Investments** : *Financial* - US  
**Goldman Sachs Group** : *Financial* - US  
**Huntington Bancshares Inc.** : *Financial* - US  
**ING** : *Financial* - Belgium  
**ING** : *Financial* - Belgium  
**ING** : *Financial* - Netherlands  
**ING** : *Financial* - US  
**Morgan Stanley** : *Financial* - US  
**Morgan Stanley** : *Financial* - US  
**Morgan Stanley** : *Financial* - US  
**Morgan Stanley** : *Financial* - US  
**Murex** : *Financial* - US  
**Nat West Bank Group** : *Financial* - US  
**National Bank of Greece** : *Financial* - Greece  
**National Bank of Romania** : *Financial* - Romania  
**Novo** : *Financial - Holding* - Denmark  
**Novo** : *Financial - Holding* - Denmark  
**Paine Webber Capital Markets** : *Financial* - US  
**Paine Webber Capital Markets** : *Financial* - US  
**Reserve Bank of Zimbabwe** : *Financial* - Zimbabwe  
**SinoPac Holdings** : *Financial* - Taiwan  
**The Blackstone Group** : *Financial - Investment* - US  
**UBS Bank** : *Financial* - Switzerland  
**Wachovia** : *Financial* - US

### Category 6 : Government - Entries : 30

**Amministrazione Provincia Venezia** : *Government* - Italy  
**Australian Department of Defence** : *Government* - Australia  
**Center for Information Services** : *Government* - US  
**Center for Information Services** : *Government* - US  
**CIEMAT - Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas - Ministerio de Educación y Ciencia** : *Government* - Spain  
**City of Fridley** : *Government* - US  
**Danmarks Statistik** : *Government* - Denmark  
**Department for Environment, Food and Rural Affairs** : *Government* - United Kingdom

**Department of Defence** : *Government - Australia*  
**Department of Finance** : *Government - Canada*  
**Department of Finance and Administration - State of Tennessee** : *Government - US*  
**DSTL - Defence Science and Technology Laboratory - Ministry of Defence** : *Government - United Kingdom*  
**Environment Canada - Experimental Studies Division** : *Government - Canada*  
**Geographical Domain for Kuban - Krasnodar Region** : *Government - Russia*  
**Government of the Province of Ontario** : *Government - Canada*  
**Herefordshire Council** : *Government - United Kingdom*  
**India Image** : *Government - India*  
**Kuntarahoitus Municipality Finance** : *Government - Finland*  
**La Caisse** : *Government - Canada*  
**Ministry of Environment and Water Management** : *Government - Hungary*  
**NASA - National Aeronautics and Space Administration** : *Government - US*  
**National Communications Authority - General Inspectorate of Communications** : *Government - Hungary*  
**National Institute For Statistics Geography and Informatics** : *Government - Mexico*  
**National Institute of Public Health** : *Government - Japan*  
**NSW Health - Health Department New South Wales** : *Government - Australia*  
**Policy Research Institute - Ministry of Agriculture, Forestry and Fisheries** : *Government - Japan*  
**SERPRO - Servico Federal de Processamento de Dados** : *Government - Brazil*  
**UDHHS - US Dept. of Health and Human Services - Information Technology Service Center** : *Government - US*  
**UDHHS - US Dept. of Health and Human Services** : *Government - US*  
**US Federal Highway Administration** : *Government - US*

**Category 7 : Healthcare - Entries : 5**

**Bimark** : *Healthcare - Medical Communications - US*  
**National Blood Service** : *Healthcare - Blood Donation - United Kingdom*  
**Oklahoma Foundation for Medical Quality** : *Healthcare - US*  
**Performance Systems International** : *Healthcare - US*  
**Siemens Medical Instruments Pte Ltd** : *Healthcare - Hearing Instruments - Singapore*

**Category 8 : Insurance - Entries : 10**

**Covenant Healthcare Systems** : *Insurance - US*  
**Danisch Re Underwriting Agencies** : *Insurance - Denmark*  
**Empire Health Care - Empire Bluecross Blueshield** : *Insurance - US*  
**Nationwide Insurance Enterprise** : *Insurance - US*  
**Norwich Union Insurance Limited** : *Insurance - United Kingdom*  
**Oriental Insurance Company Limited** : *Insurance - India*  
**Pohjola Insurance Group** : *Insurance - Finland*  
**Travelers** : *Insurance - US*  
**Travelers** : *Insurance - US*  
**Wellington Underwriting Agencies** : *Insurance - United Kingdom*

**Category 9 : Internet Provider - Entries : 37**

**AMA - Samara Services** : *Internet Provider - Zimbabwe*  
**Bezeq International** : *Internet Provider - Israel*  
**Citizens Telephone Cooperative** : *Internet Provider - US*  
**Comcast - Broadband Cable Networks** : *Internet Provider - US (x25)*  
**Comstar - United Telesystems** : *Internet Provider - Russia*  
**Cyberspace Limited** : *Internet Provider - Nigeria*  
**Cyprus Telecommunications Authority** : *Internet Provider - Cyprus*  
**Dishnet DSL Ltd.** : *Internet Provider - India*  
**DO-CODE-LACNIC** : *Internet Provider - Dominican Republic*  
**Exatt Technologies Pvt. Ltd.** : *Internet Provider - India*  
**InfoPact** : *Internet Provider - Netherlands*  
**Intellispace Inc.** : *Internet Provider - US*  
**Jaring** : *Internet Provider - Malaysia*  
**Knology Holdings Inc.** : *Internet Provider - US*  
**Knology Holdings Inc.** : *Internet Provider - US*  
**MegaPath Networks Inc.** : *Internet Provider - US*  
**Mosaic Communications Inc.** : *Internet Provider - Philippines*  
**NDO Limited** : *Internet Provider - United Kingdom*  
**Net Experts Pvt Ltd.** : *Internet Provider - Pakistan*  
**P&T Luxembourg Internet Service** : *Internet Provider - Luxembourg*  
**PACENET** : *Internet Provider - India*  
**SBC Internet Services Inc.** : *Internet Provider - US*  
**Siol** : *Internet Provider - Slovenia*  
**Skynet** : *Internet Provider - Belgium*  
**Stofa A/S** : *Internet Provider - Denmark*  
**Struer Net A/S** : *Internet Provider - Denmark*  
**Telcel** : *Internet Provider - Venezuela*  
**Telecom Argentina - Telecom-Net** : *Internet Provider - Argentina*  
**Telefónica del Sur - Surnet** : *Internet Provider - Chile*  
**Telenet** : *Internet Provider - Belgium (x3)*  
**TSTT - Telecommunications Services of Trinidad and Tobago** : *Internet Provider - Trinidad and Tobago*  
**Türk Telecom** : *Internet Provider - Turkey*  
**United Online** : *Internet Provider - US*  
**US Signal** : *Internet Provider - US*  
**UUNET Technologies Inc.** : *Internet Provider - US*  
**WestNet Pty Ltd** : *Internet Provider - Australia*

XO Communications : *Internet Provider* - US

**Category 10 : Manufacturing - Entries : 23**

Bae Systems : *Manufacturing - Defence Systems* - United Kingdom  
Bae Systems : *Manufacturing - Defence Systems* - United Kingdom  
Ball Corporation : *Manufacturing* - US  
Ball Corporation : *Manufacturing* - US  
Ford Motor Company : *Manufacturing* - US  
General Dynamics Land Systems - General Dynamics Corporation : *Manufacturing - Defence* - US  
General Electric Company : *Manufacturing* - US  
General Electric Company : *Manufacturing* - US  
General Motors Corporation : *Manufacturing* - US  
General Motors Corporation : *Manufacturing* - US  
Hewlett-Packard : *Manufacturing - Electronics* - US  
Honeywell : *Manufacturing - Electronics* - Canada  
IBM : *Manufacturing - Electronics* - US  
ITT Industries : *Manufacturing* - US  
LG Company : *Manufacturing* - Korea  
Philips : *Manufacturing - Consumer Electronics* - Netherlands  
Procter & Gamble : *Manufacturing* - US  
Raytheon : *Manufacturing* - US  
Scientific Systems : *Manufacturing - Electronics* - Ireland  
Timco : *Manufacturing - Aviation Maintenance* - US  
Unicor : *Manufacturing - Machinery* - France  
United Technologies Corporation : *Manufacturing* - US  
VolvoData : *Manufacturing* - Sweden

**Category 11 : Marketing & Retailing - Entries : 8**

A.C. Nielsen : *Marketing* - Germany  
Commission Junction : *Marketing* - US  
Enterprise IG : *Marketing - Brand Strategy* - United Kingdom  
Harvard Sales Management Company : *Marketing - Auction Business* - US  
IKEA : *Retailing - Furniture* - US  
J.D. Williams & Company : *Retailing - Internet Shopping* - United Kingdom  
Lee Enterrises : *Retailing - Local Newspapers* - US  
The Kroger Co. : *Retailing - Grocery Retailers* - US

**Category 12 : Network Technology - Entries : 4**

Acterna : *Network Technology* - US  
Asia Pacific Network Information Centre : *Network Technology - Internet Registry* - Australia  
ComClark Network & Technology Corporation : *Network Technology* - Philippines  
Starcomms Nigeria Limited : *Network Technology* - Nigeria

**Category 13 : Pharmaceuticals - Entries : 5**

Astra AB : *Pharmaceuticals* - Sweden  
Galderma Pharma : *Pharmaceuticals* - Switzerland  
Mario Negri : *Pharmaceuticals - Research* - Italy  
Orion Pharma : *Pharmaceuticals* - Finland  
UCB : *Pharmaceuticals* - Belgium

**Category 14 : Real Estate - Entries : 1**

Studley : *Real Estate* - US

**Category 15 : Research - Entries : 18**

CSIRO - Commonwealth Scientific and Industrial Research Organisation : *Research* - Australia  
ETRI - Electronics and Telecommunications Research Institute : *Research* - Korea  
Fugro : *Research* - US  
Fugro : *Research* - US  
IDIAP Research Institute : *Research* - Switzerland  
IGR - Institute Gustave-Roussy - Anticancer Centre : *Research* - France  
Institute of Animal Physiology - Slovak Academy of Sciences : *Research* - Slovak Republic  
Istituto Elettrotecnico Nazionale Galileo Ferraris - Istituto Nazionale di Ricerca Metrological : *Research* - Italy  
ITC - International Institute for Geo-Information Science and Earth Observation : *Research* - Netherlands  
Korea Atomic Energy Research Institute : *Research* - Korea  
LMTG - Laboratoire des Mécanismes et Transferts en Géologie : *Research* - France  
Matforsk : *Research* - Norway  
Miles Research Center : *Research* - US  
MIMOS - Malaysian Institute of Microelectronic Systems : *Research - Government* - Malaysia  
MOSS-CHEM - Chemistry Research : *Research* - United Kingdom  
Research Center on Scientific and Technical Information : *Research* - Algeria  
Royal Signals and Radar Establishment : *Research* - United Kingdom  
SSRI - Sino Software Research Institute : *Research* - Hong Kong



**Category 16 : Software - Entries : 3**

**Become Inc.** : *Software* - US  
**Logos Research Systems** : *Software* - US  
**Software Technology Parks of India** : *Software* - India

**Category 17 : Telecommunication - Entries : 28**

**Bharti Tele-Ventures Limited** : *Telecommunications* - India  
**BT Limited** : *Telecommunication* - Nigeria  
**Chunghwa Telecom Data Communication Business Group** : *Telecommunication* - Taiwan  
**D & E Communications** : *Telecommunication* - US  
**Eastgate** : *Telecommunication* - Malaysia  
**Global Crossing** : *Telecommunication* - US  
**Global Crossing** : *Telecommunication* - US  
**Groundhog Technologies Inc.** : *Telecommunication* - US  
**Intelsat Global Service Corporation** : *Telecommunication* - US  
**Korea Telecom** : *Telecommunication* - Korea  
**Lucent Technologies - Bell Labs Innovations** : *Telecommunication - Networking* - US  
**Motorola** : *Telecommunication* - US  
**Nokia** : *Telecommunication* - Finland  
**Nokia** : *Telecommunication* - Finland  
**PCCW Limited** : *Telecommunication* - Hong Kong  
**Public Internet Service - Emirates Telecommunications Corporation** : *Telecommunication* - United Arab Emirates  
**Radiant Communications Canada Ltd.** : *Telecommunication* - Canada  
**Reliance Infocom Ltd.** : *Telecommunication* - India  
**Saunalahti Group OYJ** : *Telecommunication* - Finland  
**Shanghai Jiading Telecom Bureau** : *Telecommunication* - China  
**Siminn - Iceland Telecom** : *Telecommunication* - Iceland  
**TCI Autonomous System** : *Telecommunication* - Iran  
**Telecom Italia Lab** : *Telecommunication* - Italy  
**Telkom SA** : *Telecommunication* - South Africa  
**TELUS Communications Inc.** : *Telecommunication* - Canada  
**Tikkacom** : *Telecommunication* - Finland  
**Videsh Sanchar Nigam Ltd.** : *Telecommunication* - India  
**Videsh Sanchar Nigam Ltd.** : *Telecommunication* - India

**Category 18 : Transportation - Entries : 4**

**Alaska Airlines** : *Transportation* - US  
**American Airlines** : *Transportation* - US  
**CSX Technologies** : *Transportation - Freight Transport* - US  
**Delta Airlines** : *Transportation* - US

## Appendix 4 : Sample 2 - Visitors from the Domains .mil, .org and .gov

### Domain .mil - US Military - Entries : 6

**Aeronautical Systems Center** : Wright-Patterson Air Force Base - Fairborn - OH - US  
**AFIT** : Artificial Intelligence Laboratory - Air Force - US  
**Brooks City Base** : Air Force - San Antonio, TX - US  
**NUWC** : Naval Undersea Warfare Center - Navy's Research Center - Newport - RI - US  
**US Air Force** : Headquarters - US  
**US Navy** : US

### Domain .org - Organizations - Entries : 9

**Children's Hospital** : The Regional Medical Center for Children - New Orleans - LA - US  
**Commonfund** : Wilton - CT - US  
**Lake Geauga Computer Associates** : Concord Township - OH - US  
**LHSAGM** : The Lutheran High School Association of Greater Milwaukee - Milwaukee - WI - US  
**MCE Society** : Maharashtra Cosmopolitan Education Society - Pune - India  
**SCESC** : Shelby County Educational Service Center - St. Shelby - OH - US  
**SLPS** : Saint Louis Public Schools - St. Louis - MD - US  
**The World Bank Group** : Washington - DC - US  
**TIAA-CREF** : Teachers Insurance and Annuity Association & College Retirement Fund - New York - NY - US

### Domain .gov - US Government - Entries : 5

**AHRQ** : Agency for Healthcare Research and Quality - Department of Health and Human Services - Rockville - MD - US  
**NASA** : National Aeronautics and Space Administration - MSFC - AL - US  
**Sandia National Laboratories** : Operated by Lockheed Martin Corporation for the Department of Energy's National Nuclear Security Administration - Albuquerque - NM - US  
**UCDCP** : US Center For Disease Control and Prevention - Government - Atlanta - GA - US  
**US Environmental Protection Agency** : Washington - DC - US

## Appendix 5 : Citations in Applications and Scientific Work

**Abouchami, W. (1), Hofmann, A.(1), Galer, S. (1), Frey, F. (2), Eisele, J.(1) & Feigenson, M. (3)**

Lead Isotopes Reveal Bilateral Asymmetry and Vertical Continuity in the Hawaiian Mantle Plume

(1) Max-Planck-Institut für Chemie, Mainz, Germany

(2) Massachusetts Institute of Technology, Cambridge, US

(3) Department of Geological Sciences, Rutgers University, New Brunswick, US

Nature, vol. 434, April 14, 2005, pp. 851-856

*Published and refereed article with in-text reference to wessa.net*

<http://www1.mpch-mainz.mpg.de/~geo/hofmann/Abouchamietal2005.pdf>

17/11/2005 - 08:40 am

**Agénor, Pierre-Richard (1), Chen, Derek H.C. (2) and Grimm, Michael (3)**

Linking Representative Household Models with Household Surveys for Poverty Analysis

A Comparison of Alternative Methodologies

(1) The World Bank and Department of Economics, Yale University, New Haven, CT, US

(2) The World Bank, Washington, DC, US

(3) Department of Economics, University of Göttingen, Germany, and DIAL Paris, France

April 27, 2003, 49 Pages

*Paper with in-text references to Xycoon*

<http://econwpa.wustl.edu:8089/eps/dev/papers/0405/0405006.pdf>

09/02/2005 - 10:19 am

**Agénor, Pierre-Richard (1), Chen, Derek H.C. (2) and Grimm, Michael (3)**

Linking Representative Household Models with Household Surveys for Poverty Analysis

A Comparison of Alternative Methodologies

(1) University of Manchester, UK, and The World Bank, Washington, DC, US

(2) The World Bank, Washington, DC, US

(3) Department of Economics, University of Göttingen, Germany, and DIAL Paris, France

University of Manchester - School of Social Sciences - Economic Studies

June 11, 2004, 48 Pages

*Paper with in-text references to Xycoon*

<http://www.socialsciences.manchester.ac.uk/economics/staffpages/agenor/pdfs/Ag-Chen-Grimm04.pdf>

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**Bergman, Patrick , Prins, Mark et al.**

Torrefaction for Entrained-Flow Gasification of Biomass

ECN Report : ECN-C--05-067

Energy Research Centre of the Netherlands, ECN Biomass, Petten, The Netherlands

July 2005, 51 Pages

*Research Report with reference to Xycoon*

<http://www.ecn.nl/docs/library/report/2005/c05067.pdf>

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**Boley, Daniel , Kazar, Baris M. , LeSage, James P. et al.**

Parameter Estimation for Spatial Autoregression Model : A Rigorous Approach

Laboratory for Advanced Research in Computing Technology and Compilers , University of Minnesota, Twin Cities, MN, US

Technical Report no. ARCTiC 05-08

University of Minnesota Digital Technology Center, Minnesota Supercomputing Institute

IEEE Transactions on Knowledge and Data Engineering, Draft Copy, May 12, 2005, 41 Pages

*Article in online journal with reference to Xycoon in References*

[http://www.arctic.umn.edu/papers/kazar\\_sar\\_05.pdf](http://www.arctic.umn.edu/papers/kazar_sar_05.pdf)

09/06/2005 - 09:38 am

**Bourne, David W.A.**

MultiForte and Boomer Manual - Chapter Five

Boomer is a PK/PD (Pharmacokinetic/Pharmacodynamic) Modeling Program

Department of Pharmaceutical Sciences, College of Pharmacy, University of Oklahoma, Health Sciences Center, Oklahoma City, OK, US

December 31, 2003

*Software Manual with references to Xycoon*

<http://pharm2.cpb.ouhsc.edu/manual/ch05.html>

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MultiForte and Boomer

Non-Linear Regression Programs for the Analysis of Pharmacokinetic and Pharmacodynamic Data

Boomer is a PK/PD (Pharmacokinetic/Pharmacodynamic) Modeling Program

Department of Pharmaceutical Sciences, College of Pharmacy, University of Oklahoma, Health Sciences Center, Oklahoma City, OK, US

November 12, 2005, 54 Pages

*Software Manual with references to Xycoon*

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**Brooks, Andy**

Kafli 8 : Introduction to Statistical Inferences

University of Akureyri, Iceland

April 10, 2005, 16 Pages

*Slides with references to Xycoon*

<http://notendur.unak.is/not/andy/StatisticsEdu/Lectures/TFGL0152Lec11.pdf>

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**Brown, Gavin**

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Thesis submitted to the University of Birmingham for the degree of Doctor of Philosophy  
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**Comaniciu, Cristina**

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Department of Electrical and Computer Engineering, Stevens Institute of Technology, Hoboken, New Jersey, US  
October, 2005, 30 Pages  
*Lecture notes with graphics from and references to Wessa.net*  
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On the Expected Optimal Value and the Optimal Expected Value  
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**Crowe, Adam , Denney, Andrea et al. (\*)**

Improving Forecast Accuracy for Purolator Courier - Final Report  
Capstone Consulting Group, Sykesville, MD, US  
(\*) University of Alberta, AB, Canada  
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<http://www.cse.unsw.edu.au/~cs9318/notes/3prep.pdf>  
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**Hoetker, Glenn**

Confounded Coefficients : Accurately Comparing Logit and Probit Coefficients Across Groups

College of Business, University of Illinois at Urbana-Champaign, Champaign, Illinois, US

October 22, 2004, 30 Pages

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[http://www.business.uiuc.edu/Working\\_Papers/papers/03-0100.pdf](http://www.business.uiuc.edu/Working_Papers/papers/03-0100.pdf)

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**Jakarta Software Project**

The Jakarta Project is a part of the ASF 'The Apache Software Foundation'

The 'Commons'-Library is a repository for small scale, reusable, code components that are useful in multiple Jakarta subprojects such as the Math-component

The 'Math'-Component is a library of lightweight, self-contained mathematics and statistics components addressing the most common practical problems not immediately available in the Java programming language

Further information about Jakarta : <http://jakarta.apache.org/commons/math/developers.html>

2004-2005

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Examples :

<http://jakarta.apache.org/commons/math/xref/org/apache/commons/math/stat/univariate/DescriptiveStatistics.html>

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**Jirina, Marcel**

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Technical Report no. 878, October, 2002, 12 Pages

*Technical Report with reference to Xycoon in References*

<http://www.cs.cas.cz/ftp://ftp.cs.cas.cz/pub/reports/v878-02.pdf>

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**Karatzas, Eleni**

? (Greek)

Department of Informatics, Aristotle University of Thessaloniki, Thessaloniki, Greece

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<http://agent.csd.auth.gr/~karatzas/mathimata/random.pdf>

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**Kazar, Baris Mustafa**

High Performance Spatial Data Mining : Scalable Methods for Spatial Autoregression

Laboratory for Advanced Research in Computing Technology and Compilers, University of Minnesota, Minneapolis, US

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<http://www.arctic.umn.edu/papers/kazar-phd-thesis.pdf>

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**Kropiwiec, Diogo**

ARIMA

Laboratorio de Administracao e Seguranca de Sistemas, State University of Campinas, São Paulo, Brazil

June 16, 2005, 22 Pages

*Seminar Slides with Wessa.net output and citation of Xycoon in the References*

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Industrial Engineering and Operations Research, North Carolina State University, Raleigh, US

2003, 153 Pages

*Master's Degree Thesis with citation of Xycoon in the References*

<http://www.lib.ncsu.edu/theses/available/etd-06302003-122951/unrestricted/etd.pdf>

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**Maia, Aline de Holanda Nunes**

Modelagem da Evolução da Resistência de Pragas a Toxinas Bt Expressas em Culturas Transgênicas

Quantificação de Risco Utilizando Análise de Incertezas

Tese apresentada para obtenção do título de Doutor em Agronomia, Área de Concentração: Fitotecnia

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<http://www.teses.usp.br/teses/disponiveis/11/11136/tde-19012004-100211/publico/aline.pdf>

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Variables Aleatorias Continuas

UOC : Universidad Oberta de Catalunya - Open University of Catalonia, Barcelona, Spain

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*Paper with citation of Xycoon in the References*

[http://www.uoc.edu/in3/e-math/docs/VA\\_continuas\\_2.pdf](http://www.uoc.edu/in3/e-math/docs/VA_continuas_2.pdf)

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Stevens Institute of Technology; School of Engineering, Department of Electrical and Computer Engineering, Hoboken, NJ, US  
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Analysis of Quality Weighted Gene Expression Data

Laboratory of Computational Biology, Technion, Israel Institute of Technology, Haifa, Israel

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*Online software with reference to Xycoon in References*

<http://bioinfo.cs.technion.ac.il/projects/Kahana-Navon/>

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United Nations Coordination Unit in Tajikistan

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The Relative Flexibility of B-DNA and A-RNA Duplexes : Database Analysis

(1) Molecular Modelling and Bioinformatics Unit, Institut de Recerca Biomèdica, Barcelona, Spain

(2) Institute for Mathematics, Swiss Federal Polytechnical Institute, Lausanne, Switzerland

(3) Departament de Físicoquímica, Facultat de Farmàcia, Universitat de Barcelona, Spain

(4) Departament de Bioquímica i Biologia Molecular, Facultat de Química, Universitat de Barcelona, Spain

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**Pöyliö, Jouni**

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Industrial Engineering and Management, Helsinki University of Technology, Helsinki, Finland

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Product Quality Research Institute, Arlington, VA, US

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<http://www.pqri.org/minutes/pdfs/dptc/psdpcwg/083002min.pdf>

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**Ricci, Vito**

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February 21, 2005, 24 Pages

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<http://cran.r-project.org/doc/contrib/Ricci-distributions-en.pdf>

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School of Electrical Engineering and Computer Science, University of Newcastle, Australia

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Prognostowanie Finansowych Szeregów Czasowych

Forecasting Financial Time Series (Case Studies)

Faculty of Economic Sciences, University of Warsaw, Poland

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17/11/2005 - 08:48 am

**Siefkes, Christian**

Software Package : de.fu\_berlin.ties.util

Freie Universität Berlin, Berlin, Germany

Development of this software is supported by the German Research Society, Berlin-Brandenburg Graduate School in Distributed Information Systems

Software available through the Free Software Foundation, Boston, Massachusetts, US (<http://www.gnu.org>)

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State University of New York, University at Albany, Nelson A. Rockefeller College of Public Affairs and Policy, Albany, NY, US

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The Lognormal Distribution Is Not an Appropriate Null Hypothesis for the Species-Abundance Distribution

(1) Department of Biology, University of York, UK

(2) Biodiversity and Macroecology Group, Department of Animal and Plant Sciences, University of Sheffield, UK

Journal of Animal Ecology, Peer-reviewed full-text article for future issue

Online publication date : March 7, 2005, 14 Pages

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Cost-Based Cache Replacement and Server Selection for Multimedia Proxy Across Wireless Internet

IEEE Transactions on Multimedia, vol. 6, no. 4, August, 2004, pp. 587-598

(1) Microsoft Research Asia, Beijing, China

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[Based%20Cache%20Replacement%20and%20Server%20Selection%20for%20Multimedia%20Proxy%20Across%20Wireless%20Internet.pdf](http://dslab.csie.ncu.edu.tw/93html/paper/pdf/Cost-Based%20Cache%20Replacement%20and%20Server%20Selection%20for%20Multimedia%20Proxy%20Across%20Wireless%20Internet.pdf)

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21/11/2005 - 01:55 pm

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<http://scholar.google.com/scholar/about.html>  
24/11/2005 - 01:09 pm

**Internet Assigned Numbers Authority**

<http://www.iana.org/cctld/cctld-whois.htm>  
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**Internet Corporation for Assigned Names and Numbers**

<http://www.icann.org/registries/listing.html>  
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09/02/2005 - 10:09 am

**Web-Enabled Scientific Services and Applications**

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09/02/2005 - 08:21 am

**Xycoon Website**

<http://www.xycoon.com>  
09/02/2005 - 08:22 am



