



The SOCR Resource

SOCR: Statistics Online Computational Resource - Netscape

File Edit View Go Bookmarks Tools Window Help

http://www.socr.ucla.edu/

New Tab SCI-BITES: Journals Rank... SOCR Events SOCR CAUSE... SOCR: Statistics Online Co...

SOCR Home Tools Distributions Experiments Analyses Games Modeler Charts More Translate SOCR

Statistics Online Computational Resource

SOCR News, Events, Announcements SOCR/CAUSEway 2007 Workshop It's online, therefore it exists!

What is SOCR?

The goals of the SOCR Resource are to design, validate and freely disseminate knowledge. Our Resource specifically provides portable online aids for probability and statistics education, technology based instruction and statistical computing. SOCR tools and resources include a repository of interactive applets, computational and graphing tools, instructional and course materials.

INTERACTIVE SOCR TOOLS

SOCR Distributions  
SOCR Experiments  
SOCR Analyses  
SOCR Games  
SOCR Data Modeler  
SOCR Plots & Charts

# Core SOCR Resources

**Data**

**Virtual Demos**

**Tools & Activities**

**Concepts & Methods**

**Infrastructure**

- [http://socr.ucla.edu/SOCR\\_HT\\_ResourceViewer.html](http://socr.ucla.edu/SOCR_HT_ResourceViewer.html)
- [http://wiki.stat.ucla.edu/socr/index.php/SOCR\\_News](http://wiki.stat.ucla.edu/socr/index.php/SOCR_News)
- [http://socr.ucla.edu/htmls/SOCR\\_Languages.html](http://socr.ucla.edu/htmls/SOCR_Languages.html)
- [http://socr.ucla.edu/docs/SOCR\\_Documentation.html](http://socr.ucla.edu/docs/SOCR_Documentation.html)

## FEATURES

- 70+ Distributions
- Graphs
- PDFs
- CDFs
- Inverse CDFs
- Random Sampling
- Moments
- Web Interfaces
- Interactive
  - Probability-values
  - Critical-values

## SOCR Distributions

Bernoulli Distribution; Beta Distribution; Beta (Generalized) Distribution; Binomial Distribution; Birthday Distribution; Cauchy Distribution; Chi-Square Distribution; Circle Distribution; Continuous Uniform Distribution; Die Distribution; Discrete ArcSine Distribution; Discrete Uniform Distribution; Erlang Distribution; Error Distribution; Exponential Distribution; Fisher's F Distribution; Fisher-Tippett Distribution; Gamma Distribution; General Cauchy Distribution; Geometric Distribution; Gilbrats Distribution; Gumbel Distribution; Half-Normal Distribution; HyperGeometric Distribution; Laplace Distribution; Logarithmic Distribution; Logistic Distribution; Log-Normal Distribution; Matching Distribution; Maxwell Distribution; MixtureDistribution; Negative-Binomial Distribution; Normal Distribution; Pareto Distribution; Point-Mass Distribution; Poisson Distribution; Poker-Dice Distribution; Power-Function Distribution; Rayleigh Distribution; Student's T Distribution; Student's T Non-Central Distribution; Triangle Distribution; Von Mises Distribution; WalkMaxDistribution; WalkPositionDistribution; Weibull Distribution;

<http://www.socr.ucla.edu/htmls/dist>

[http://wiki.stat.ucla.edu/socr/index.php/About\\_pages\\_for\\_SOCR\\_Distributions](http://wiki.stat.ucla.edu/socr/index.php/About_pages_for_SOCR_Distributions)

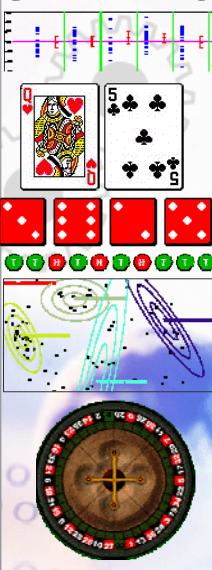
### FEATURES

- 65+ Experiments
- Simulations
- Summary Stats
- Models vs. Observed data
- GUIs
- Web Interface
- Based on VLPS

## SOCR Experiments

Ballot Experiment Ball and Urn Experiment Bertrand Experiment Beta Coin Experiment Beta Estimate Experiment Binomial Coin Experiment Binomial Timeline Experiment Birthday Experiment Bivariate Normal Experiment Bivariate Uniform Experiment Buffon's Coin Experiment Buffon's Needle Experiment CardExperiment Chi Square Dice Experiment Chuck A Luck Experiment Coin Die Experiment Coin Sample Experiment Confidence Interval Experiment Coupon Collector Experiment Craps Experiment Dice Experiment Dice Sample Experiment Dice Coin Experiment Finite Order Statistic Experiment Fire Experiment Galton Board Experiment Game Gamma Estimate Experiment Gamma Experiment Markov Chain Experiment Match Experiment Mean Estimate Experiment Mean Test Experiment Mixture Model EM Experiment Monty Hall Experiment Negative Binomial Experiment Normal Estimate Experiment Order Statistics Experiment Pareto Estimate Experiment Problem of Points Experiment Two-Dimensional Poisson Experiment Poisson Experiment Two-Type Poisson Experiment Poker Dice Experiment Poker Experiment Probability Plot Experiment Proportion Estimate Experiment Proportion Test Experiment Quantile JApplet Random Variable Experiment Random Walk Experiment Red and Black Experiment Roulette Experiment Sample Mean Experiment Sign Test Experiment Spinner Experiment Triangle Experiment Uniform Estimate Experiment Variance Estimate Experiment Variance Test Experiment Voter Experiment

<http://www.socr.ucla.edu/htmls/exp>  
[http://wiki.stat.ucla.edu/socr/index.php/About\\_pages\\_for\\_SOCR\\_Experiments](http://wiki.stat.ucla.edu/socr/index.php/About_pages_for_SOCR_Experiments)



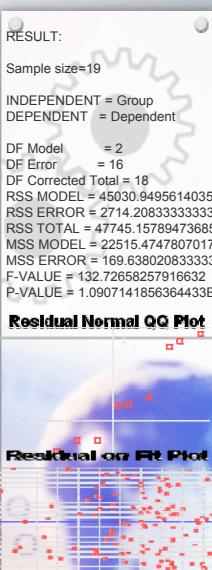
### FEATURES

- Param+NonParam
- Graphs
- Summary Stats
- R Interface
- GUIs
- Web Interface

## SOCR Analyses

ANOVA - One Way  
 ANOVA - Two Way  
 $\chi^2$  Model Goodness-of-Fit Test  
 Multiple Regression Analysis  
 One Sample T Test  
 Simple Regression Analysis  
 Two Independent Sample T Test  
 Two Independent Sample Wilcoxon Rank Sum Test  
 Two Paired Sample Sign-Test  
 Two Paired Sample Signed-Rank Test (Wilcoxon)  
 Two Paired Sample T Test  
 ...

<http://www.socr.ucla.edu/htmls/ana>  
[http://wiki.stat.ucla.edu/socr/index.php/About\\_pages\\_for\\_SOCR\\_Analyses](http://wiki.stat.ucla.edu/socr/index.php/About_pages_for_SOCR_Analyses)



**FEATURES**

- Distribution Model Fitting
- Fourier and Wavelet Data Modeling
- Random Number Generator (any SOCR distribution)
- Graphs
- GUIs
- Web Interface

## SOCR Modeler

BetaFit\_Modeler  
 ExponentialFit\_Modeler  
 FourierFit\_Modeler  
 GammaFit\_Modeler  
 MixedFit\_Modeler  
 NormalFit\_Modeler  
 PoissonFit\_Modeler  
 WaveletFit\_Modeler

[http://www.socr.ucla.edu/htmls/SOCR\\_Modeler.html](http://www.socr.ucla.edu/htmls/SOCR_Modeler.html)  
[http://wiki.stat.ucla.edu/socr/index.php/About\\_pages\\_for\\_SOCR\\_Modeler](http://wiki.stat.ucla.edu/socr/index.php/About_pages_for_SOCR_Modeler)

**FEATURES**

- 60+ Dynamic Interactive Graphs
- Summary Stats
- GUIs
- Web Interface
- Based on JFreeCharts

## SOCR Charts

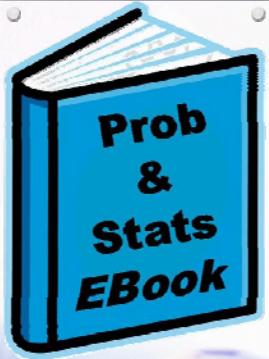
- SOCRCharts
  - Pie Charts
  - Bar Charts
  - Line Charts
    - LineChartDemo1
    - LineChartDemo2
    - LineChartDemo3
    - LineChartDemo5
    - LineChartDemo6
    - ScatterChartDemo1
    - DotChart
    - IndexChart
    - QQData2DataDemo
    - QQNormalPlotDemo
    - NormalDistributionDemo
    - StatisticalLineCharDemo1
    - StatisticalLineCharDemo2
    - XYStepRenderDemo1
  - Area Charts
  - Miscellaneous

[www.socr.ucla.edu/htmls/SOCR\\_Charts.html](http://www.socr.ucla.edu/htmls/SOCR_Charts.html)

## Prob & Stats EBook

1 Preface  
 2 Chapter I: Introduction to Statistics  
 3 Chapter II: Describing, Exploring, and Comparing Data  
 4 Chapter III: Probability  
 5 Chapter IV: Probability Distributions  
 6 Chapter V: Normal Probability Distribution  
 7 Chapter VI: Relations Between Distributions  
 8 Chapter VII: Point and Interval Estimates  
 9 Chapter VIII: Hypothesis Testing  
 10 Chapter IX: Inferences From Two Samples  
 11 Chapter X: Correlation and Regression  
 12 Chapter XI: Analysis of Variance (ANOVA)  
 13 Chapter XII: Non-Parametric Inference  
 14 Chapter XIII: Multinomial Experiments and Contingency Tables  
 15 Additional EBook Chapters

<http://wiki.stat.ucla.edu/socr/index.php/EBook>



**Features**

- it is community-built
- open-access (dev & use)
- blends concepts with IT
- multi-lingual.

**FEATURES**

- SOCR External Tools
- Web-based
- Freely available

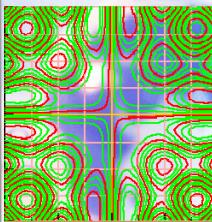
## Additional SOCR Resources

<u><a href="#">High-Precision Distribution Calculators</a></u>	<u><a href="#">Conceptual Demo Applets</a></u>
<u><a href="#">Tables</a></u>	<u><a href="#">Online Real-Time Statistics Data Analysis</a></u>
<u><a href="#">Function and Image-Processing Tools</a></u>	<u><a href="#">Other Online Compute Resources</a></u>

<http://www.socr.ucla.edu/Applets.dir/OnlineResources.html>



T <sub>df</sub>	$\alpha = 0.1$	0.05
$\infty$	$t_{\alpha} = 1.282$	1.645
1	3.078	6.314
2	1.886	2.920
3	1.638	2.353



## SOCR Usage

- Course instructors and teachers
  - Class notes, interactive tools & activities useful for student motivation & concept demonstration
- Students and trainees
  - SOCR class notes, analyses, computational and graphing tools for learning & practicing
- Model developers, software engineers & researchers
  - Light-weight plug-in oriented SOCR computational libraries and infrastructure useful in their algorithm designs and research efforts.

**SOCR=** Statistical Computing  
Technology-based Instruction  
Open-Source Project

File View 3DView HyperGraphs

(default) Deutsch Español Français Italiano Português 日本語

한국어 中文 繁體中文 Pycces Nederlands Elλinikó

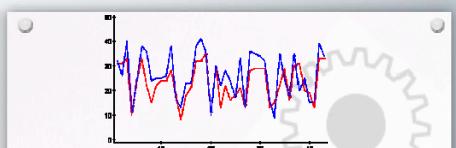
## SOCR Usage

Visitor Log for **Statistics Online Computational Resource**

- > 230K active SOCR users (1 count/user/day)
- > ¾M SOCR Wiki resource users
- National & International users
- 18% Quarterly ↑

# SOCR Instruction

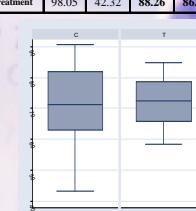
- SOCR is Tested in:
  - Lower Div., Upper Div. and Graduate Courses
  - Major, Minor and Service Courses
  - Small (~10) & Large Classes (100)
  - 20 Instructors
  - > 20 courses
  - >2,500 students
- Validated on Variety of Study Designs
  - Pooling results from 3 studies, SOCR effect  $p < 0.00098$   
*(Dinov, Sanchez and Christou, 2008)*
- Studies of student knowledge acquisition, learning-styles, attitudes towards Prob & Stats and quantitative performance (2004-2009)
- [www.socr.ucla.edu/htmls/SOCR\\_References.html](http://www.socr.ucla.edu/htmls/SOCR_References.html)



Demographics	Stat13 section 1		Stat13 section 2		Statistics
	Control	Treatment	Control	Treatment	
Freshmen	24	7			
Sophomores	18	14			
Juniors	16	38			
Seniors	23	29			
Graduates	2	0			
Total	83	88			

	Group	High		Low		Median	Mean	Standard Deviation	Statistics
		High	Low	High	Low				
Midterm	Control	100	53	84.3	83.9	10			
	Treatment	100	58	88	86	10	$t_{(169)} = 1.37$ $p=0.089$		
Final	Control	100	42	83	81.2	13			
	Treatment	99	35	87	83.8	12	$t_{(169)} = 1.34$ $p=0.093$		
Overall Performance	Control	96.89	53.6	<b>86.82</b>	<b>84.57</b>	9.1			
	Treatment	98.05	42.32	<b>88.26</b>	<b>86.68</b>	9.9	$t_{(169)} = 1.448$ $p=0.075$		

# SOCR Acknowledgments

Funded by

NSF DUE 0442992 & 0716055  
NIH U54 RR021813

Collaborators

N Christou, J Sanchez, R Gould  
J Cui, A Che, A Toga

[www.socr.ucla.edu/htmls/SOCR\\_Acknowledgments.html](http://www.socr.ucla.edu/htmls/SOCR_Acknowledgments.html)  
[www.socr.ucla.edu/htmls/SOCR\\_References.html](http://www.socr.ucla.edu/htmls/SOCR_References.html)

[www.SOCR.ucla.edu](http://www.SOCR.ucla.edu)  
[www.StatisticsResource.org](http://www.StatisticsResource.org)



## SOCR Demos

- Functors & Distributions
- Experiments
- Analyses
- Charts
- Modeler
- Data

[www.SOCR.ucla.edu](http://www.SOCR.ucla.edu)