


Statistical Analysis and Data Visualization using Statgraphics

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A decorative graphic consisting of several horizontal lines of varying lengths and colors (teal, white, and light blue) extending from the right side of the slide towards the center.

Data Visualization

The graphical presentation of data (*and statistics calculated from that data*), with the goal of providing the viewer with a qualitative understanding of the information it contains.

Statgraphics Centurion

Interactive program for Windows.

First developed in 1980.

Contains over 220 menu selections for data analysis and statistical modeling.

I will be using a pre-beta release of Version 17.

Outline

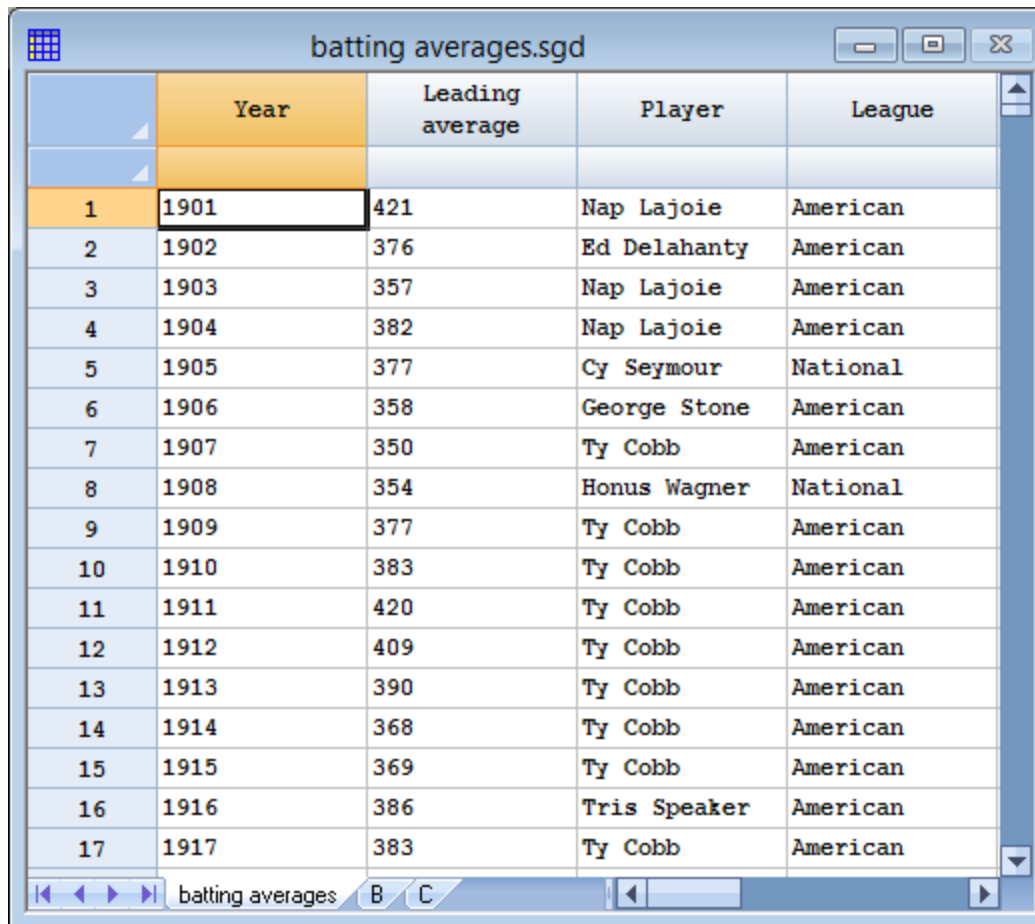
- Visualizing 1 variable
 - Time series forecasting
 - Distribution fitting & capability analysis
- Visualizing 2 variables
 - Scatterplot smoothing
 - Bivariate density estimation
- Modeling the relationship between variables
 - Curve fitting
 - Surface fitting
 - Correlation plots (corrgram)
- Design of experiments
 - Pareto charts
 - Gradient surface plots
 - Gradient contour plots
 - 3-D contour plots
 - 3-D mesh plots
 - Exploring response surfaces

Outline

- Modeling geophysical data
 - Gradient brushing
 - Response maps (Kriging)
 - Variance maps
- Demographic maps
 - Brushing maps
 - Gradient maps
 - Dynamic maps for tracking changes
- Visualizing multivariate data
 - Matrix plots
 - Parallel coordinate plots
 - Star glyphs
 - Chernoff faces
- Visualizing multiple time series
 - Dynamic visualization

Visualizing a Single Time Series

Leading batting average in MLB (1901-2013)



	Year	Leading average	Player	League
1	1901	421	Nap Lajoie	American
2	1902	376	Ed Delahanty	American
3	1903	357	Nap Lajoie	American
4	1904	382	Nap Lajoie	American
5	1905	377	Cy Seymour	National
6	1906	358	George Stone	American
7	1907	350	Ty Cobb	American
8	1908	354	Honus Wagner	National
9	1909	377	Ty Cobb	American
10	1910	383	Ty Cobb	American
11	1911	420	Ty Cobb	American
12	1912	409	Ty Cobb	American
13	1913	390	Ty Cobb	American
14	1914	368	Ty Cobb	American
15	1915	369	Ty Cobb	American
16	1916	386	Tris Speaker	American
17	1917	383	Ty Cobb	American

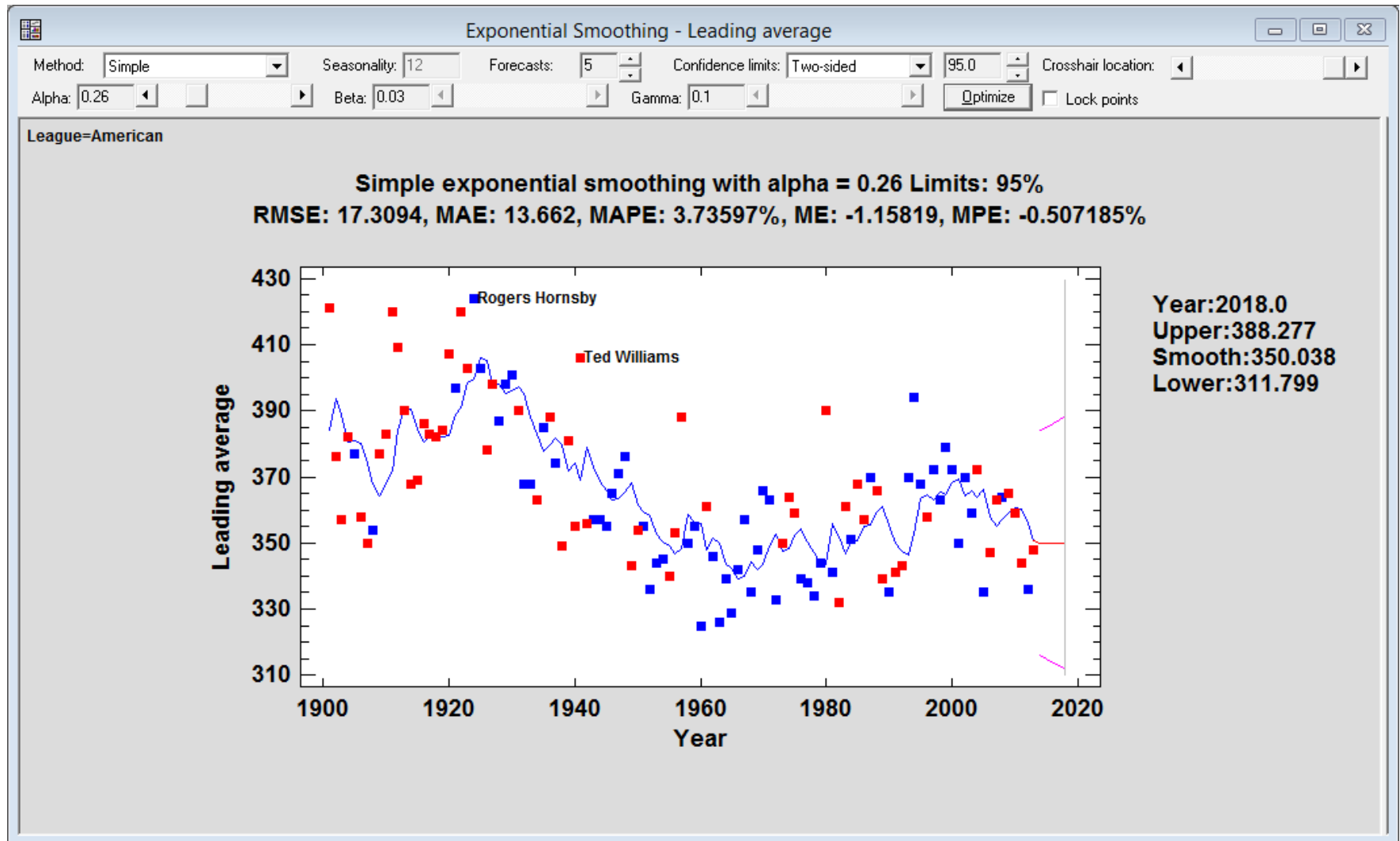
Exponential Smoothing

$$S_t = \alpha Y_t + (1 - \alpha)S_{t-1}$$

$$0 < \alpha < 1$$

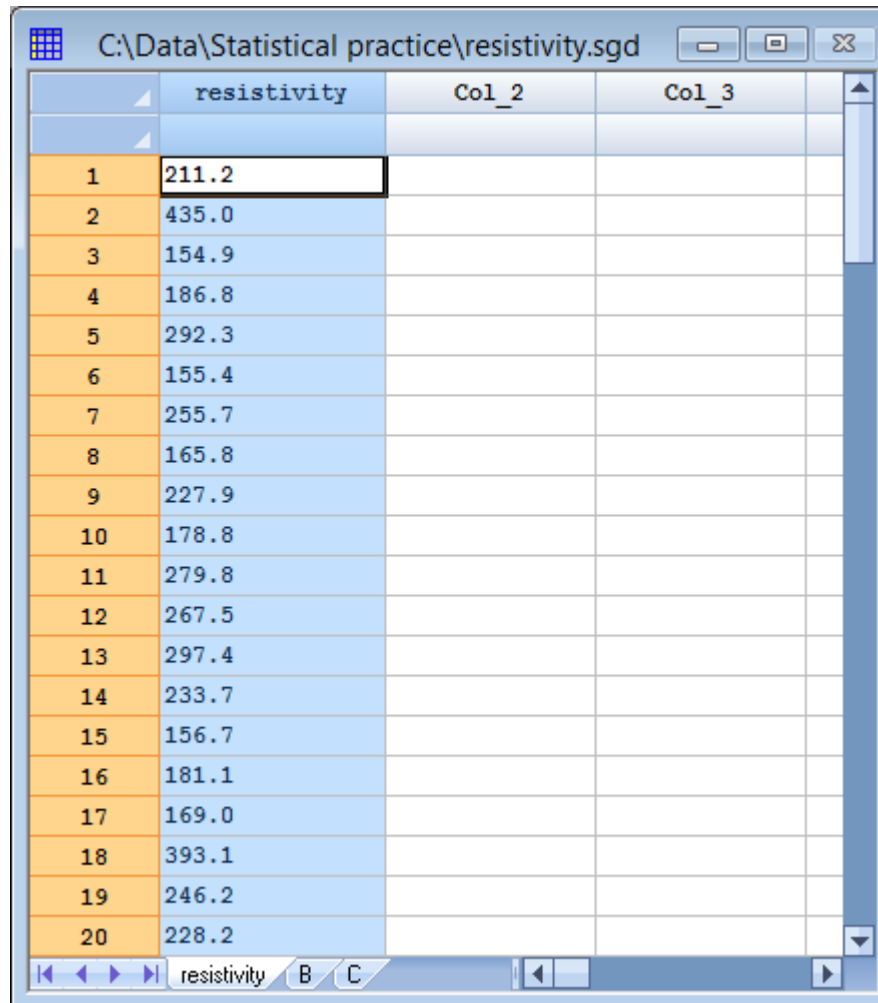
Equivalent to an ARIMA(0,1,1) model

Exponential Smoothing Statlet



Modeling a Single Variable

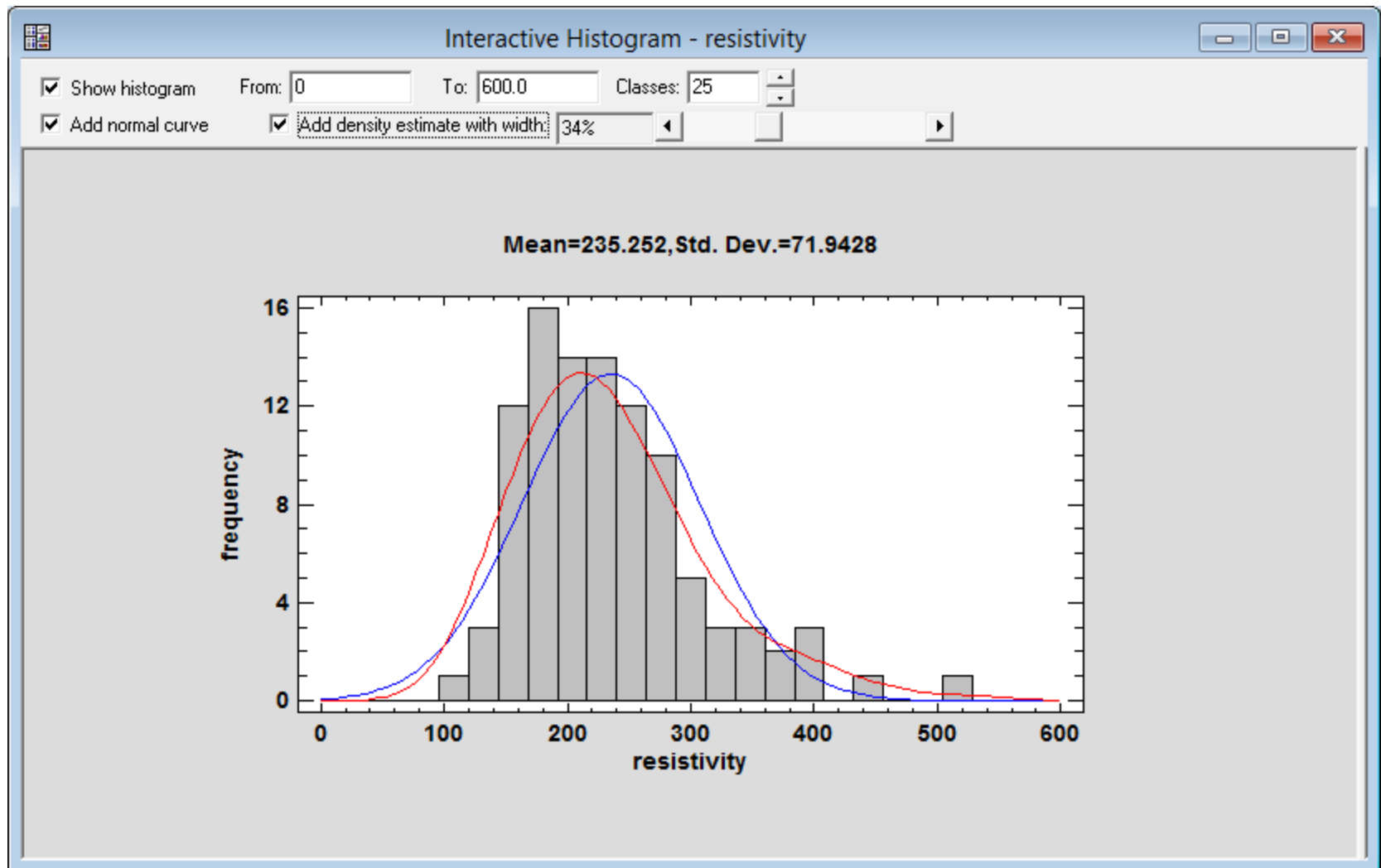
Measured resistivity of $n=100$ electronic components



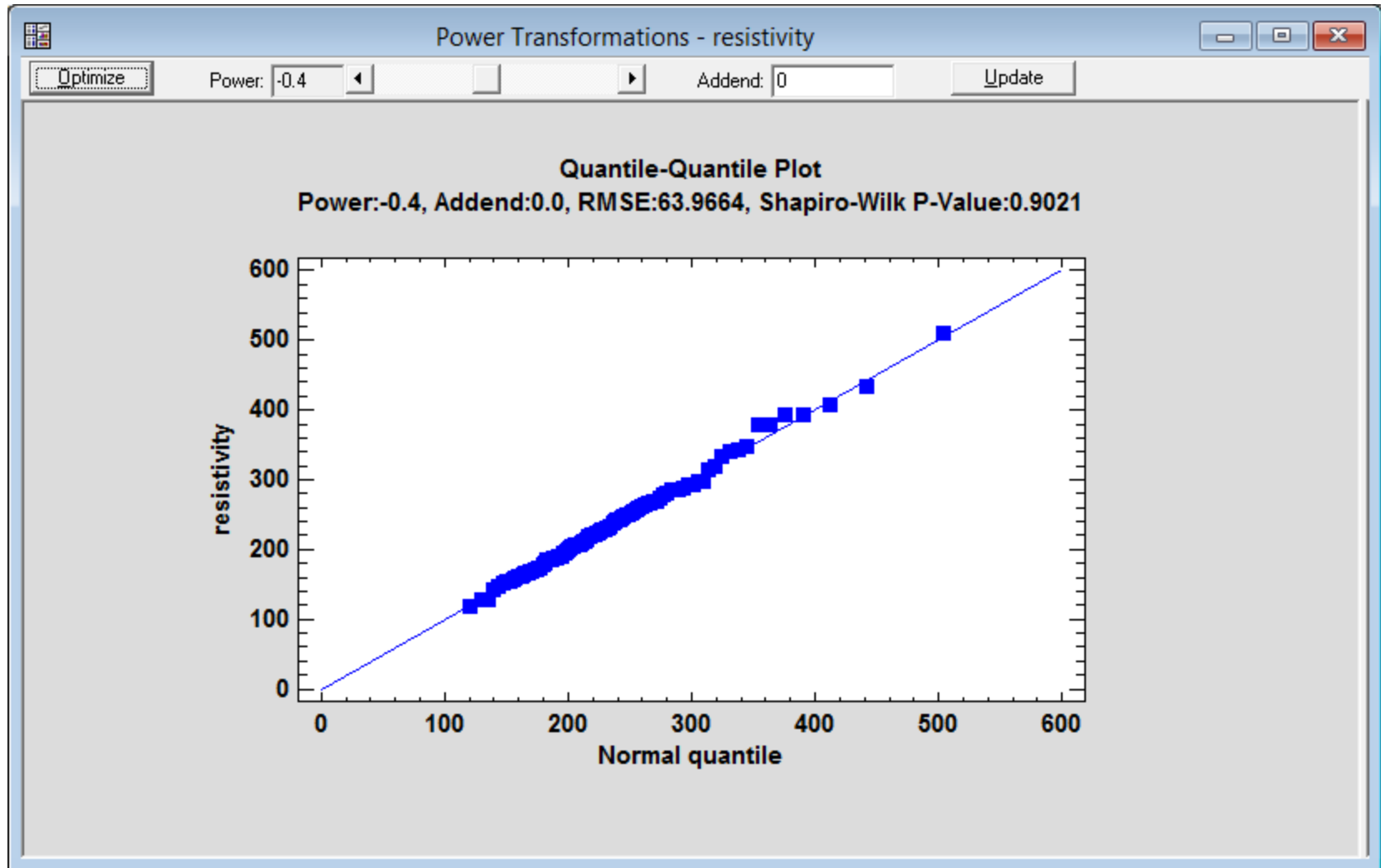
The image shows a spreadsheet window titled "C:\Data\Statistical practice\resistivity.sgd". The spreadsheet has three columns: "resistivity", "Col_2", and "Col_3". The "resistivity" column contains 20 rows of data, with the first row highlighted in orange. The values in the "resistivity" column are: 211.2, 435.0, 154.9, 186.8, 292.3, 155.4, 255.7, 165.8, 227.9, 178.8, 279.8, 267.5, 297.4, 233.7, 156.7, 181.1, 169.0, 393.1, 246.2, and 228.2. The "Col_2" and "Col_3" columns are empty.

	resistivity	Col_2	Col_3
1	211.2		
2	435.0		
3	154.9		
4	186.8		
5	292.3		
6	155.4		
7	255.7		
8	165.8		
9	227.9		
10	178.8		
11	279.8		
12	267.5		
13	297.4		
14	233.7		
15	156.7		
16	181.1		
17	169.0		
18	393.1		
19	246.2		
20	228.2		

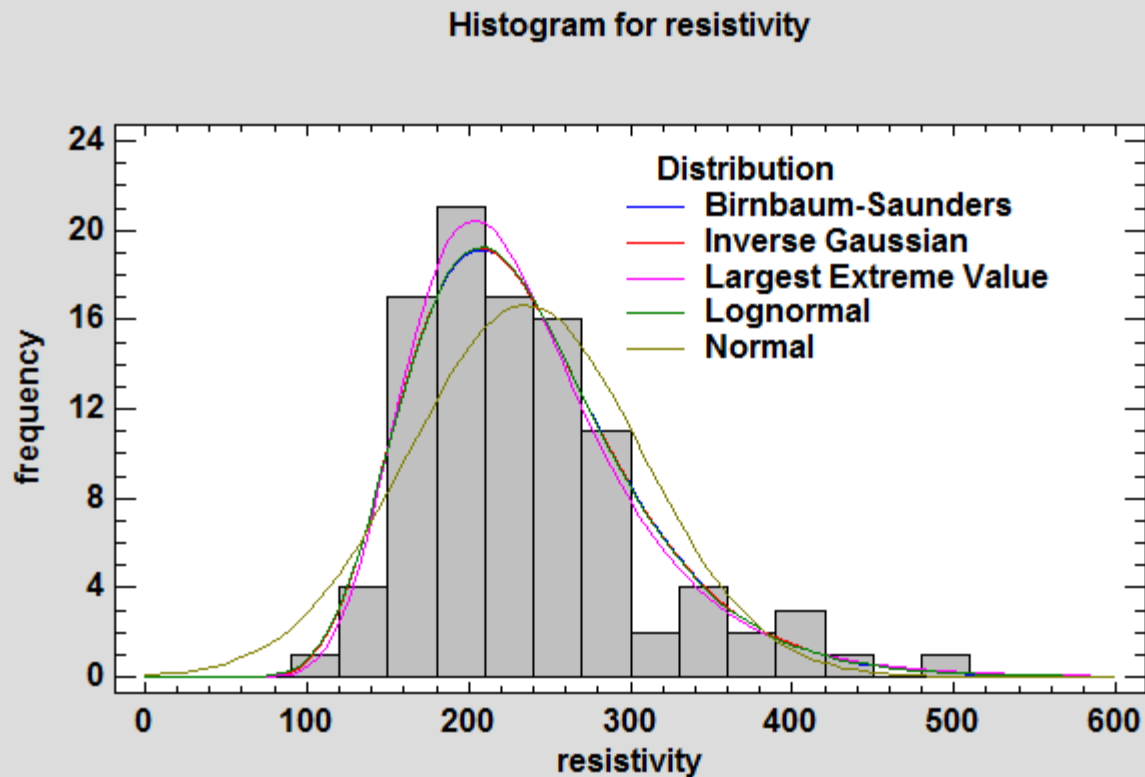
Interactive Histogram Statlet



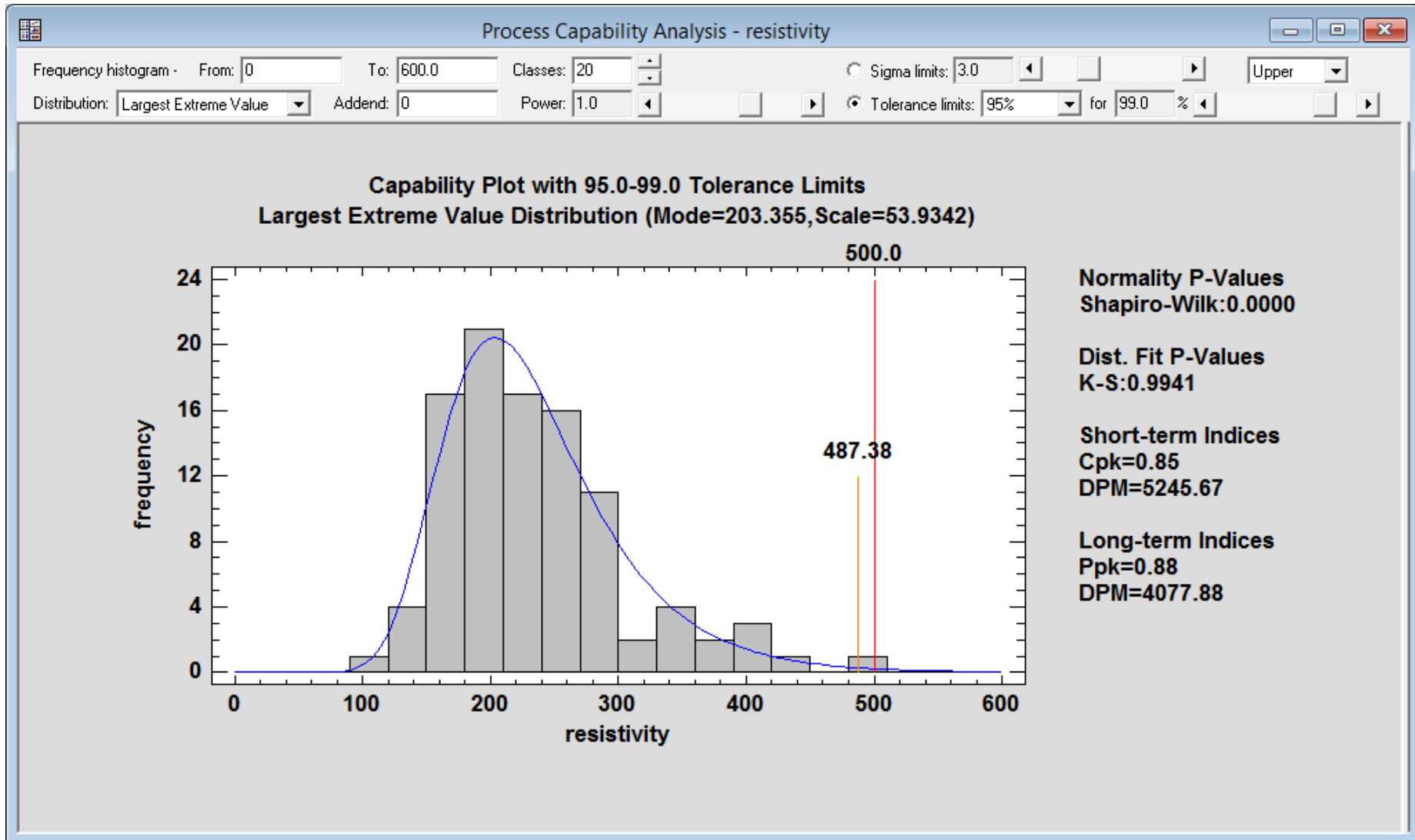
Power Transformation Statlet



Distribution Fitting

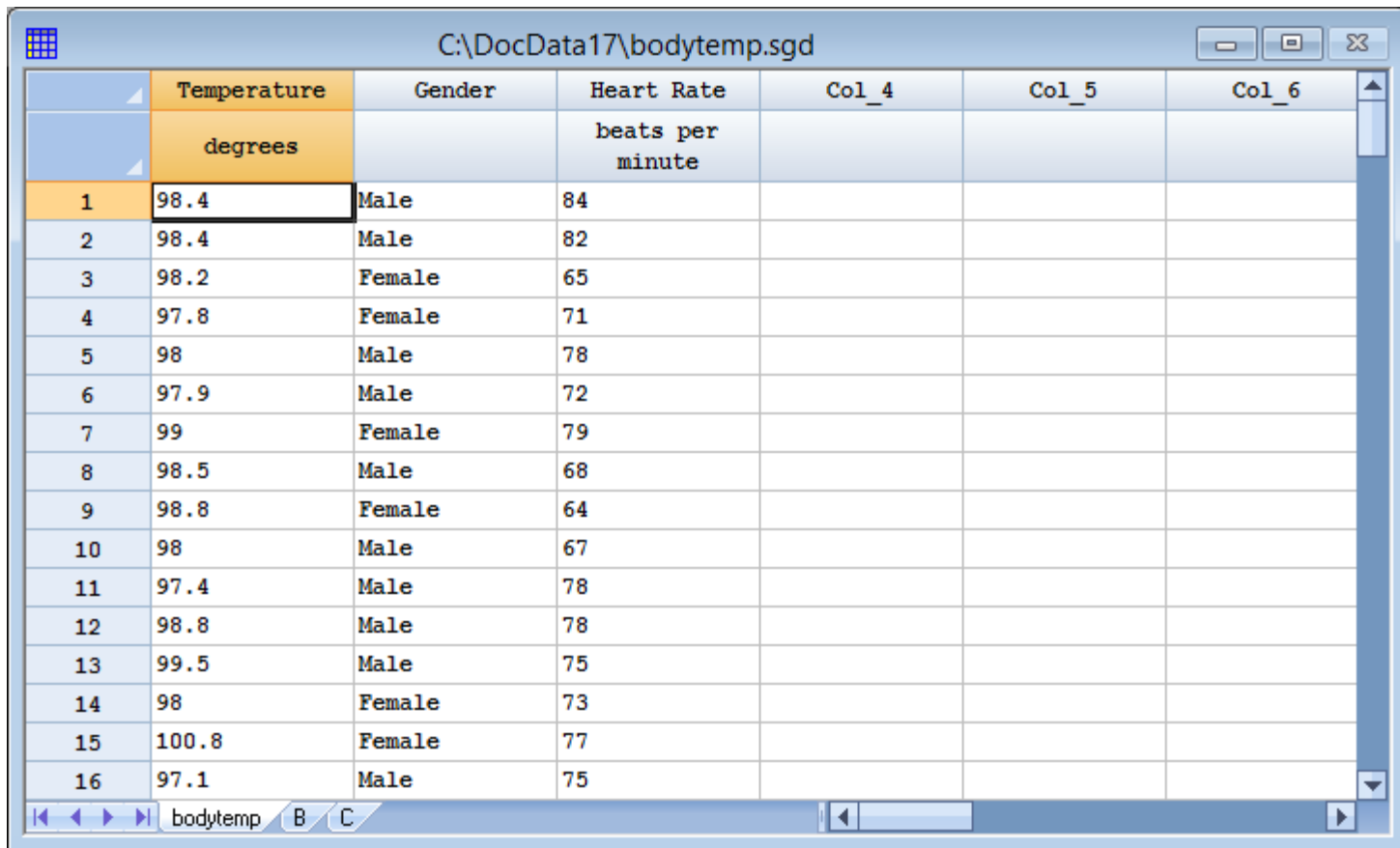


Process Capability Analysis Statlet



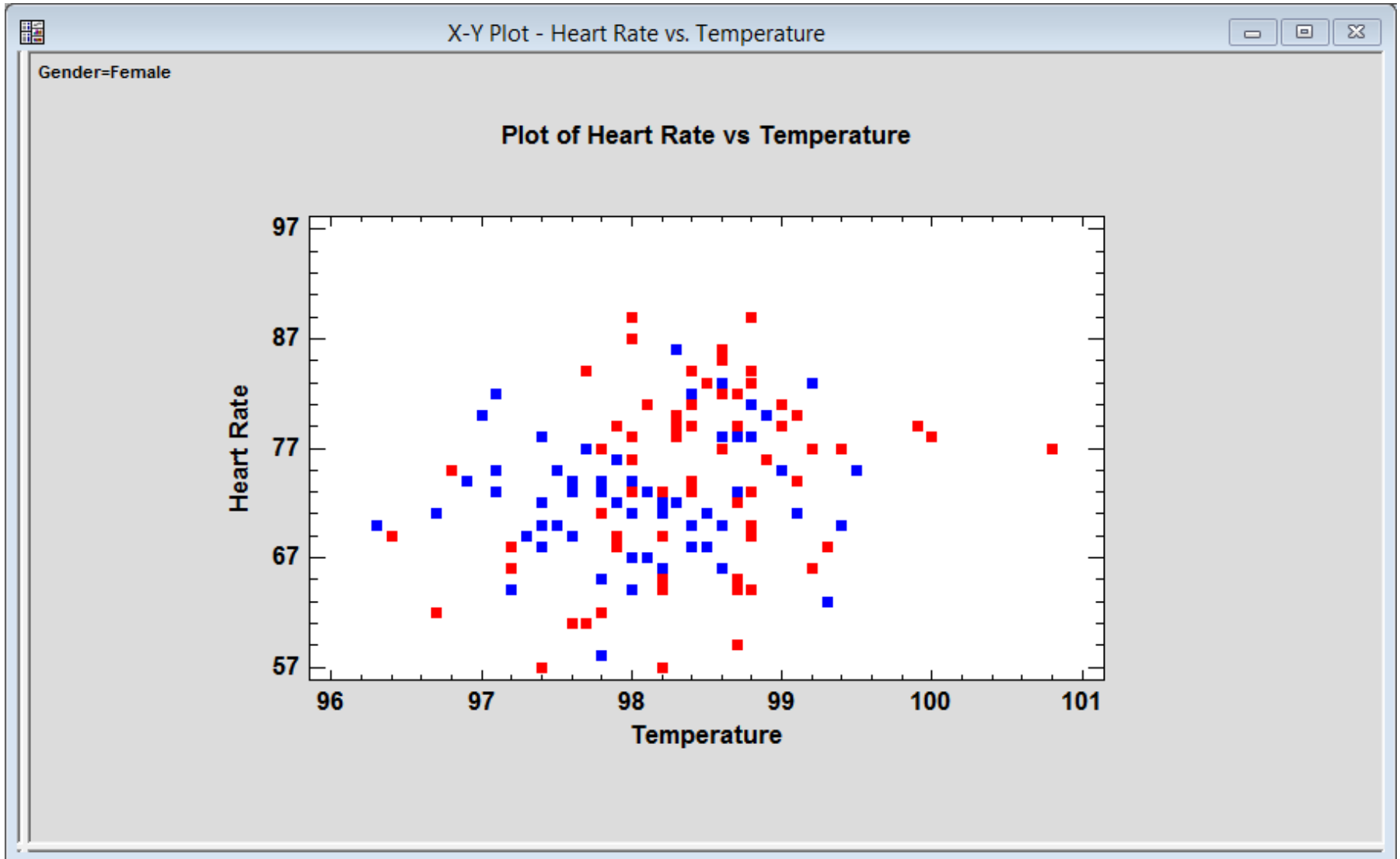
Modeling 2 Variables

Temperatures and heart rates of n=130 individuals

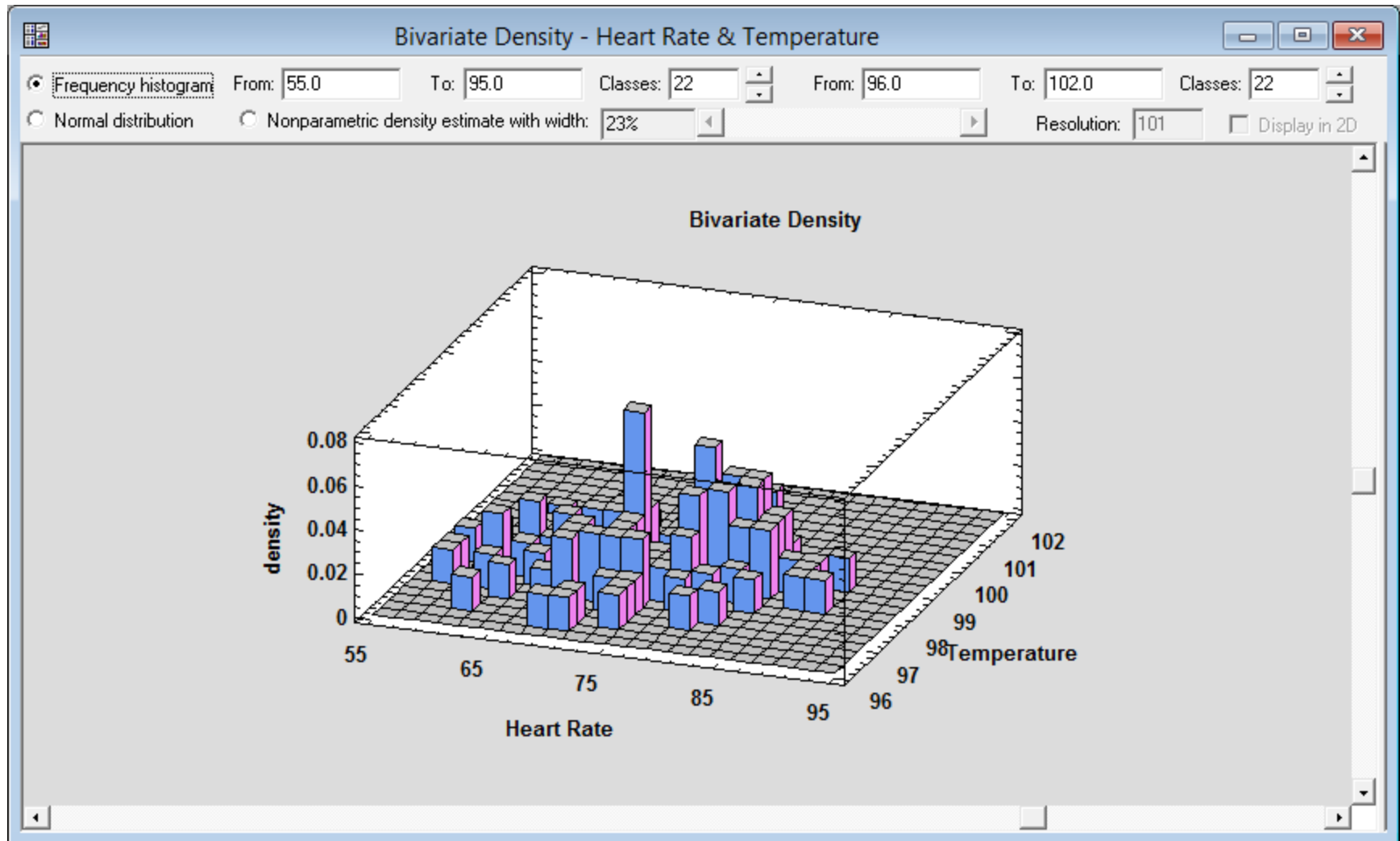


	Temperature	Gender	Heart Rate	Col_4	Col_5	Col_6
	degrees		beats per minute			
1	98.4	Male	84			
2	98.4	Male	82			
3	98.2	Female	65			
4	97.8	Female	71			
5	98	Male	78			
6	97.9	Male	72			
7	99	Female	79			
8	98.5	Male	68			
9	98.8	Female	64			
10	98	Male	67			
11	97.4	Male	78			
12	98.8	Male	78			
13	99.5	Male	75			
14	98	Female	73			
15	100.8	Female	77			
16	97.1	Male	75			

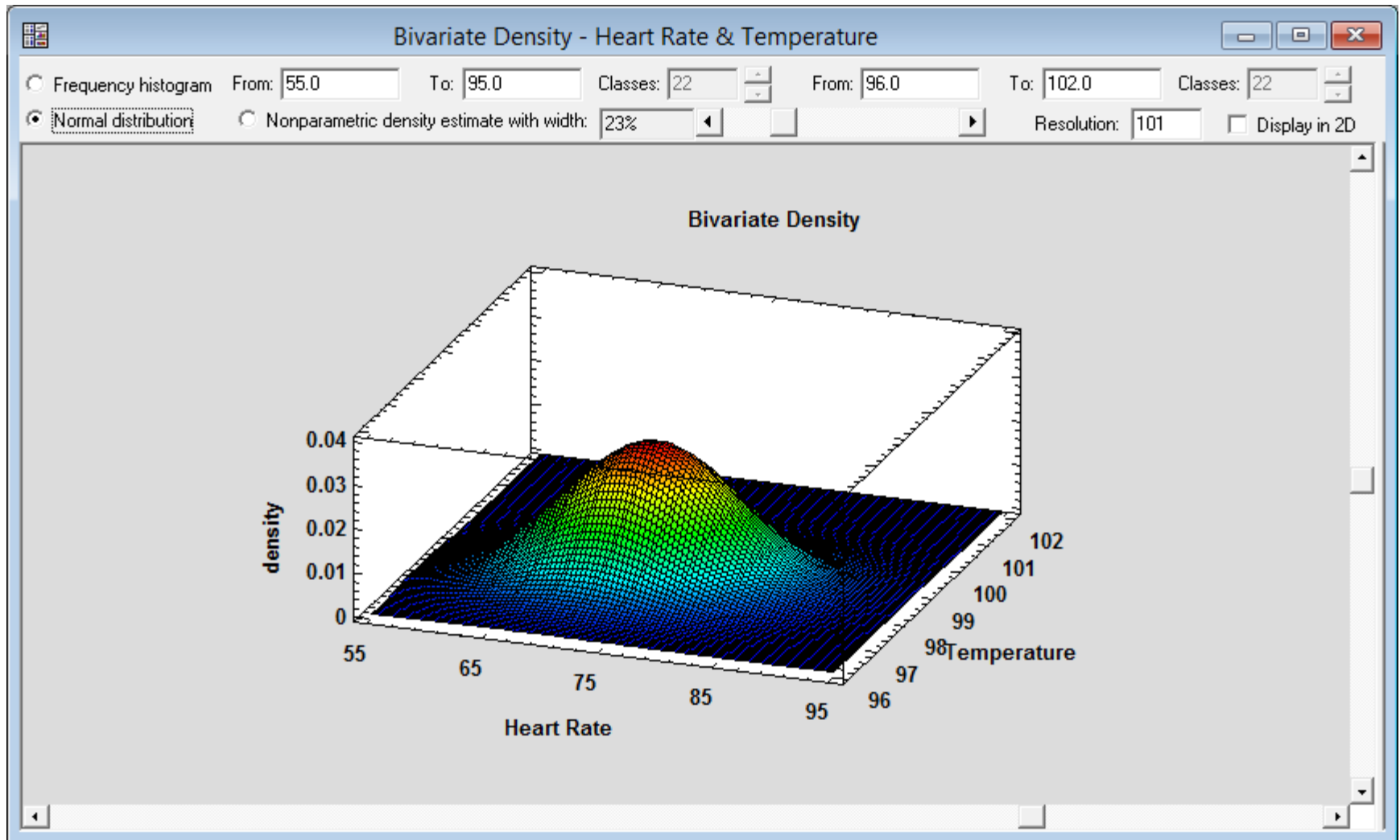
Scatterplot - Highlighting



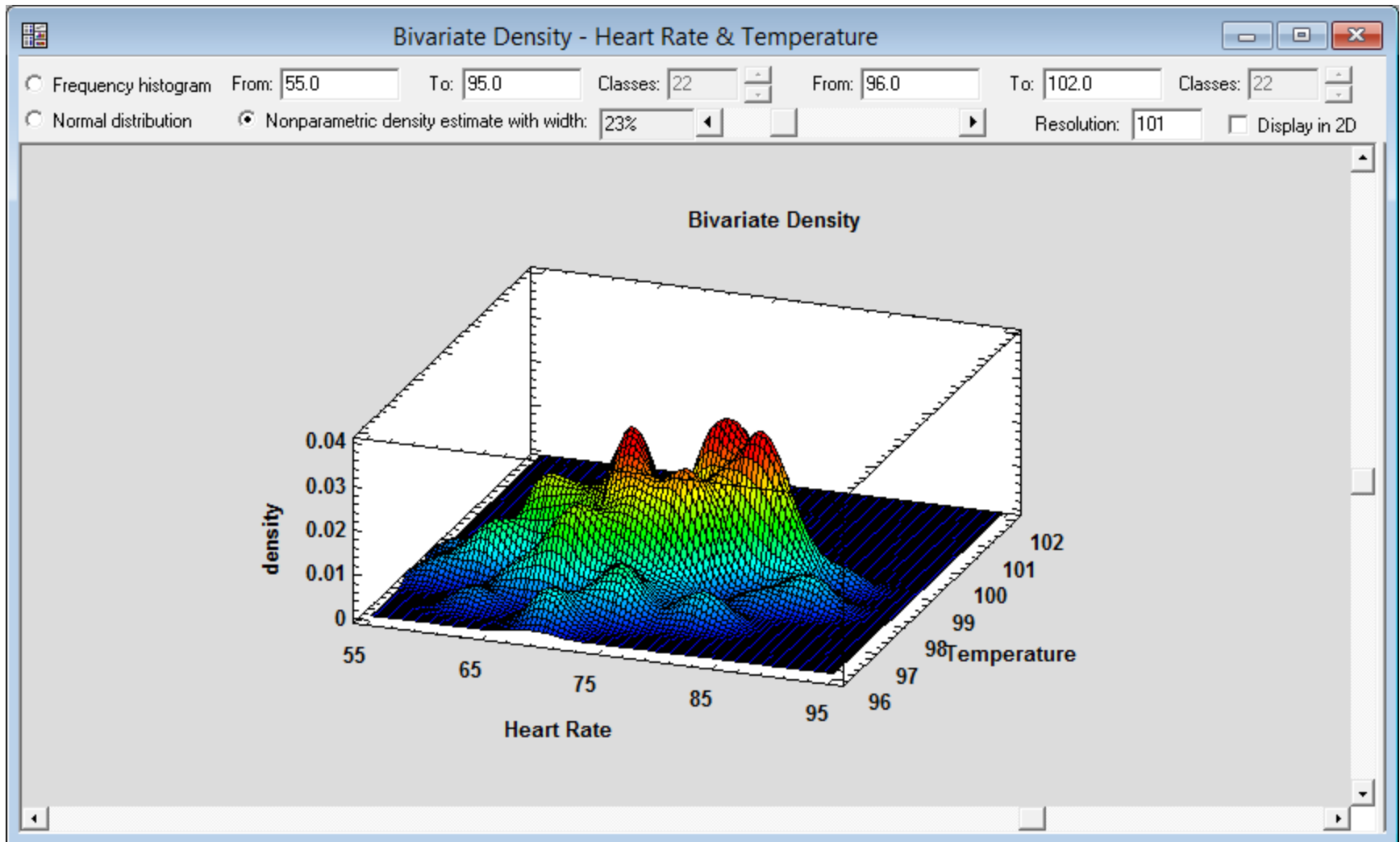
Bivariate Histogram Statlet



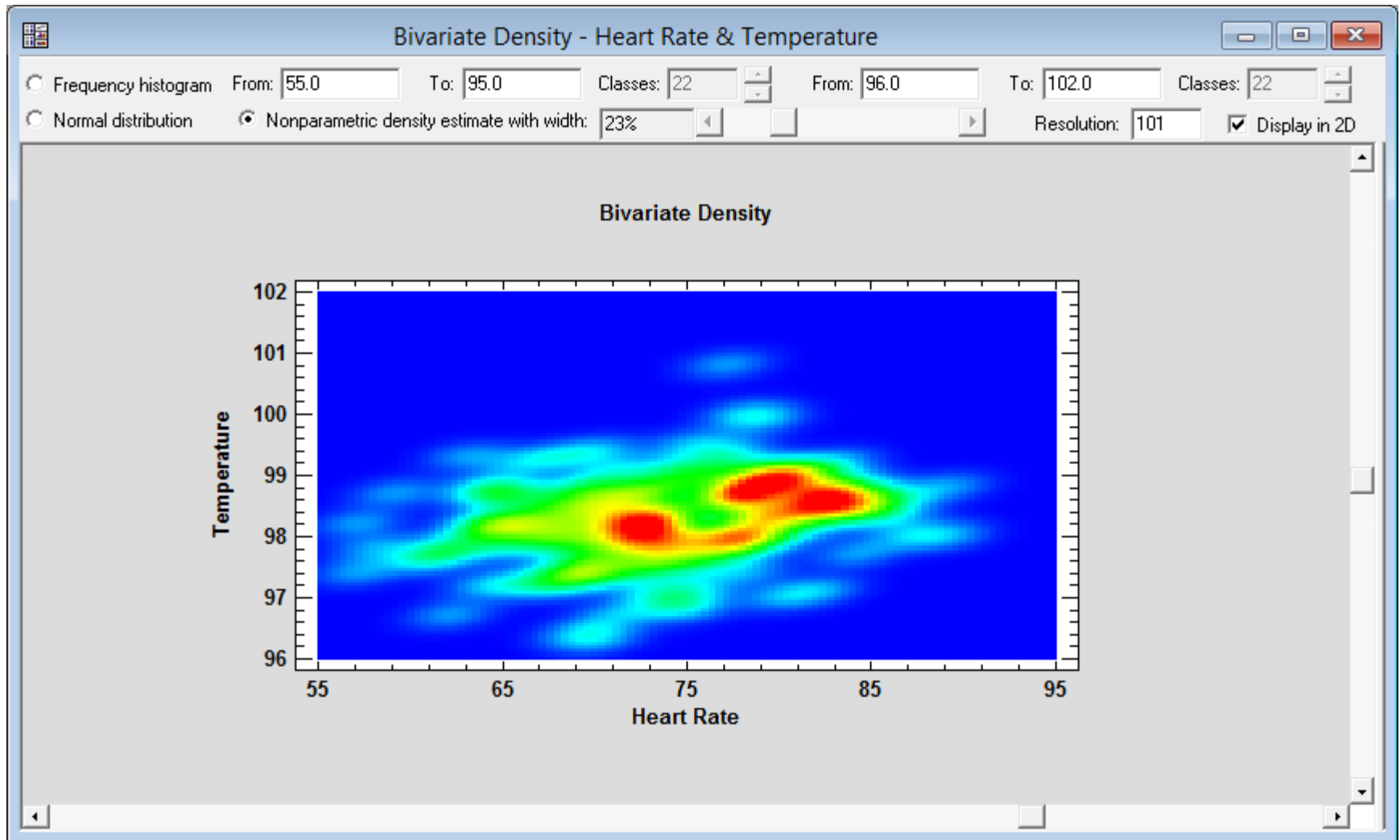
Bivariate Normal Distribution



Nonparametric Density Estimator

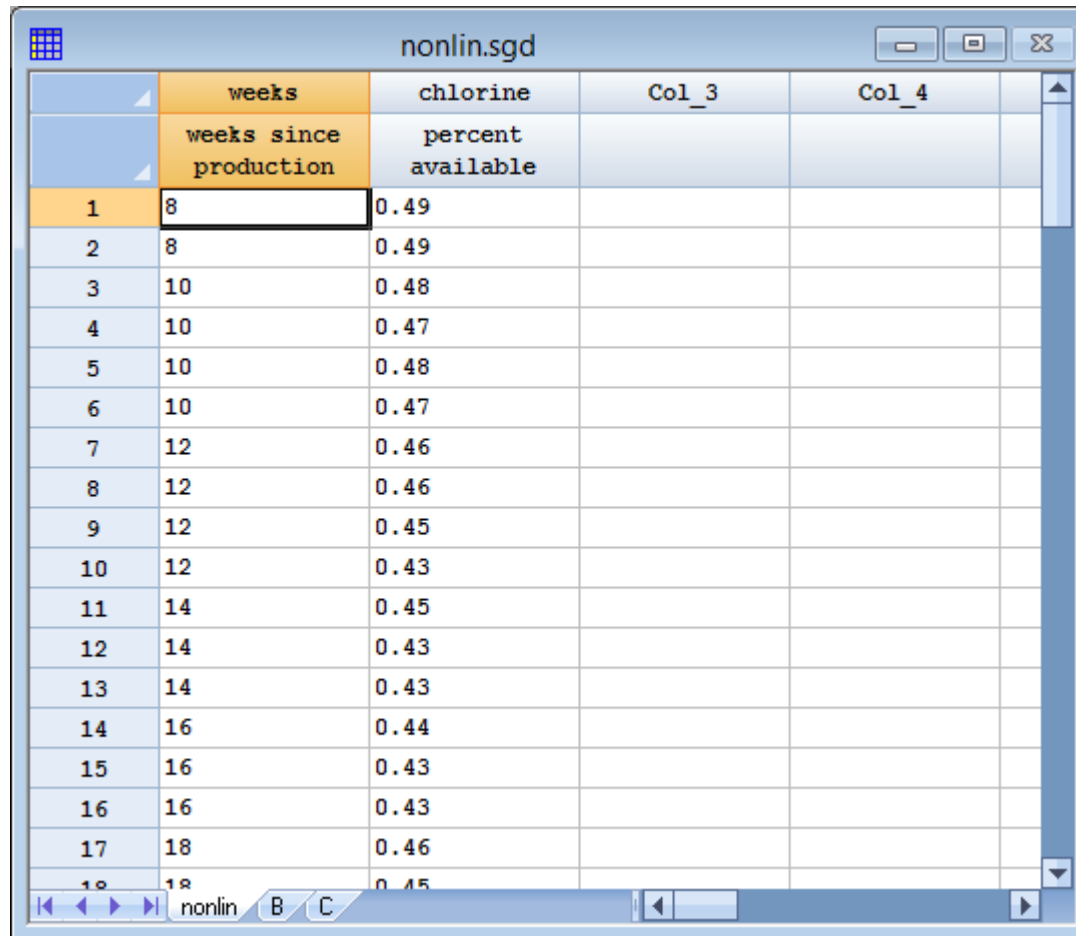


Nonparametric Density Estimator



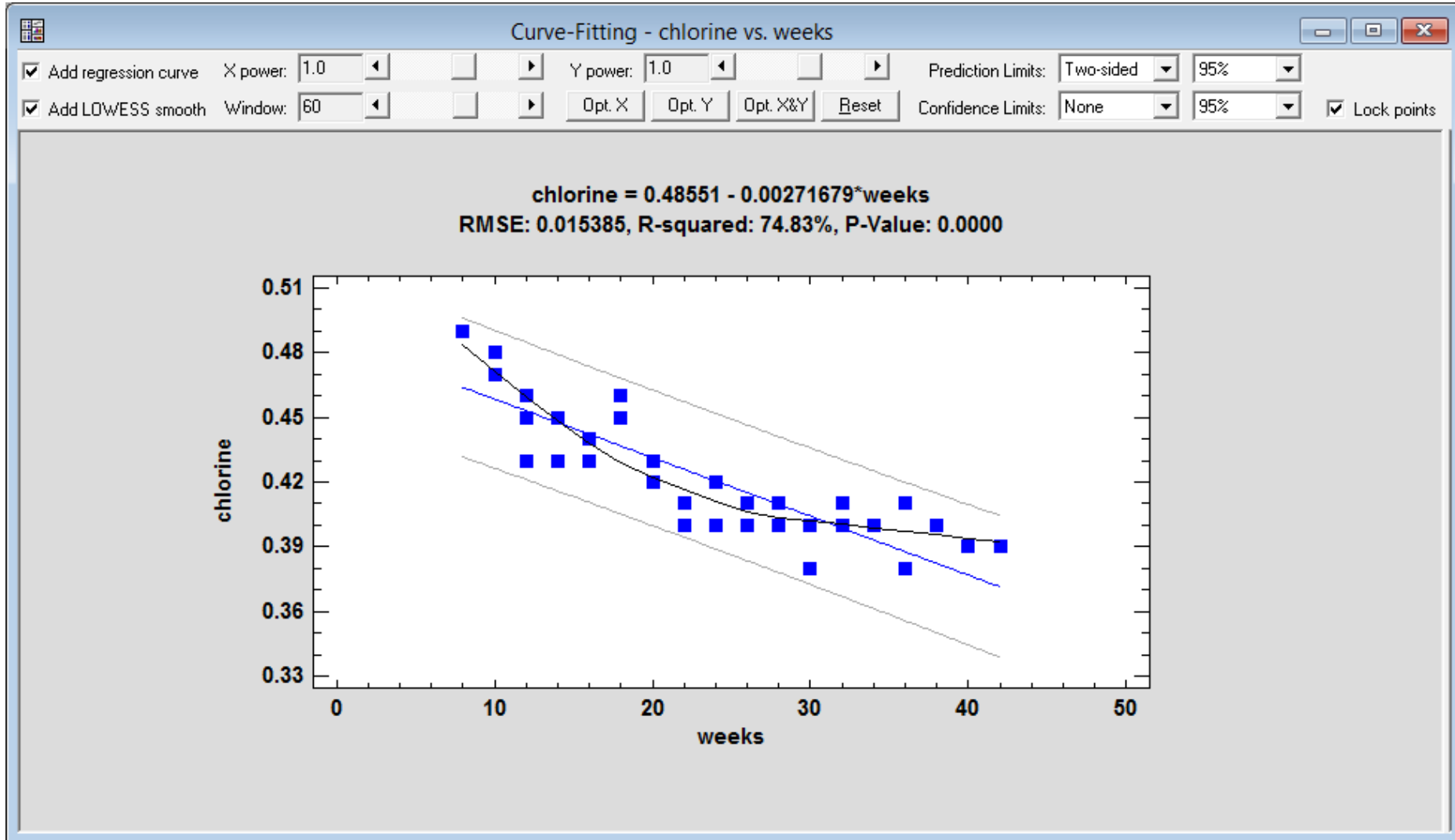
Modeling the Relationship Between 2 Variables

n=44 samples from a stability study



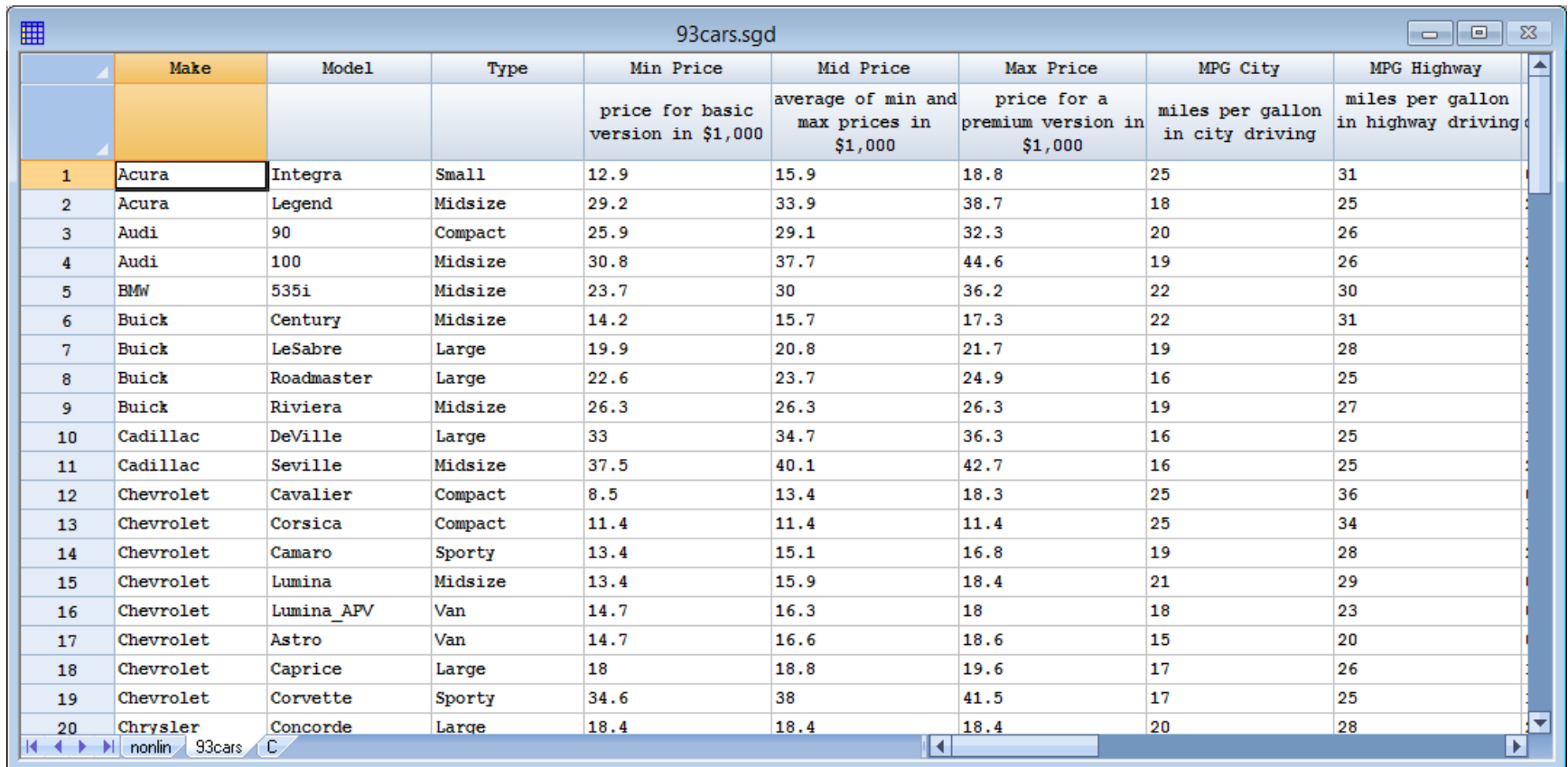
	weeks	chlorine	Col_3	Col_4
	weeks since production	percent available		
1	8	0.49		
2	8	0.49		
3	10	0.48		
4	10	0.47		
5	10	0.48		
6	10	0.47		
7	12	0.46		
8	12	0.46		
9	12	0.45		
10	12	0.43		
11	14	0.45		
12	14	0.43		
13	14	0.43		
14	16	0.44		
15	16	0.43		
16	16	0.43		
17	18	0.46		
18	18	0.45		

Curve Fitting Statlet



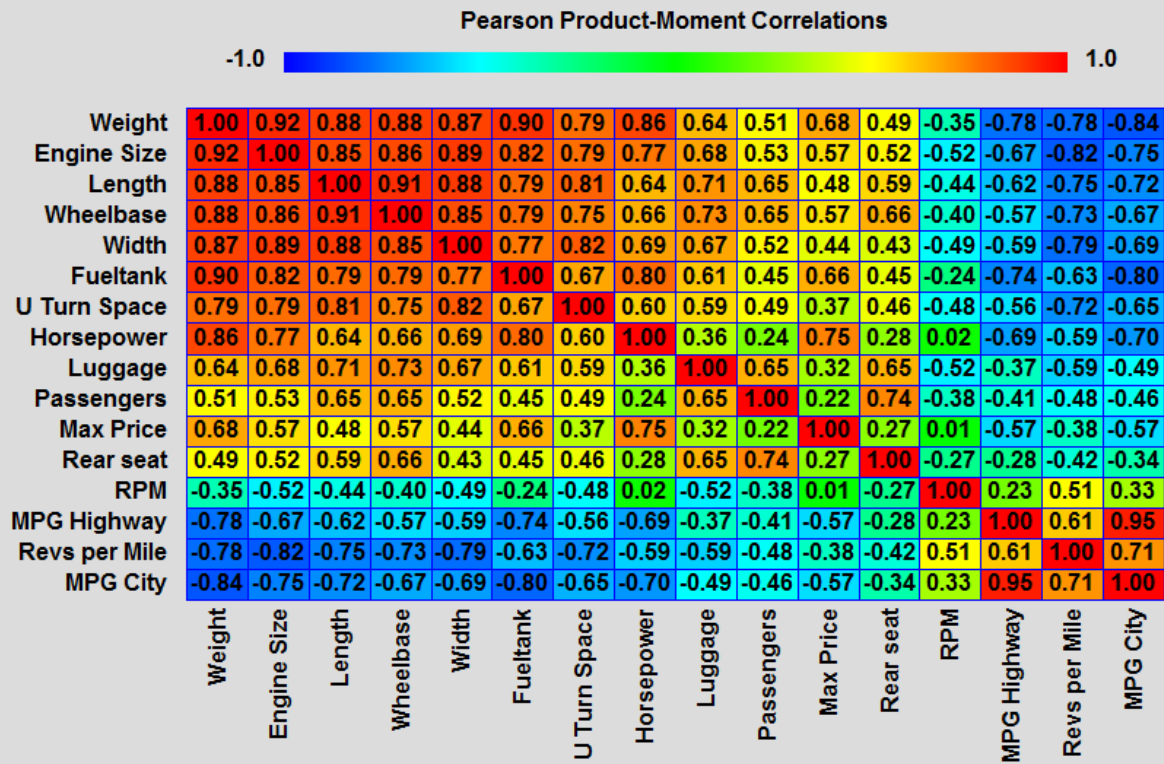
Modeling the Relationship Between Multiple Variables

n=93 automobiles

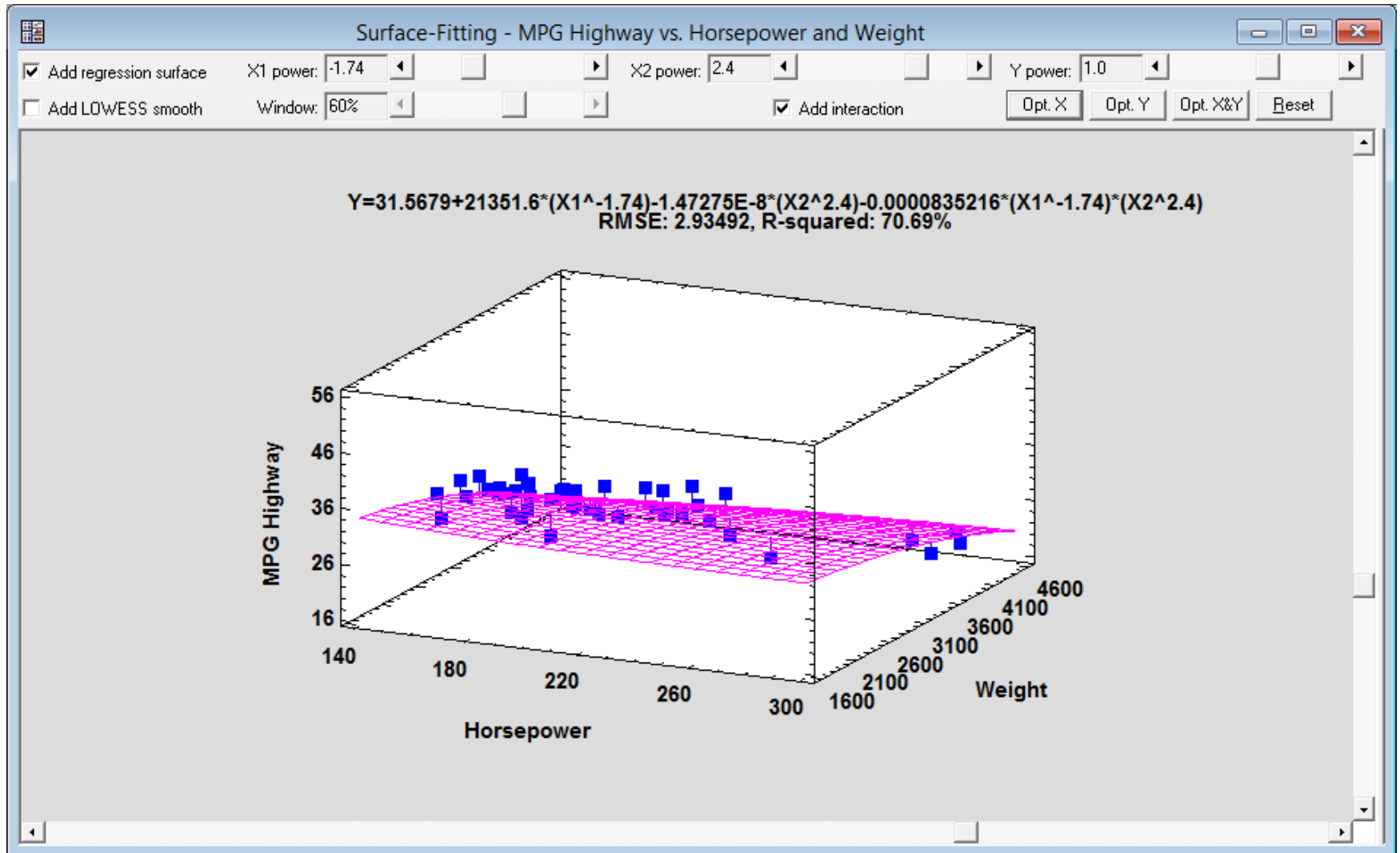


	Make	Model	Type	Min Price	Mid Price	Max Price	MPG City	MPG Highway
				price for basic version in \$1,000	average of min and max prices in \$1,000	price for a premium version in \$1,000	miles per gallon in city driving	miles per gallon in highway driving
1	Acura	Integra	Small	12.9	15.9	18.8	25	31
2	Acura	Legend	Midsize	29.2	33.9	38.7	18	25
3	Audi	90	Compact	25.9	29.1	32.3	20	26
4	Audi	100	Midsize	30.8	37.7	44.6	19	26
5	BMW	535i	Midsize	23.7	30	36.2	22	30
6	Buick	Century	Midsize	14.2	15.7	17.3	22	31
7	Buick	LeSabre	Large	19.9	20.8	21.7	19	28
8	Buick	Roadmaster	Large	22.6	23.7	24.9	16	25
9	Buick	Riviera	Midsize	26.3	26.3	26.3	19	27
10	Cadillac	DeVille	Large	33	34.7	36.3	16	25
11	Cadillac	Seville	Midsize	37.5	40.1	42.7	16	25
12	Chevrolet	Cavalier	Compact	8.5	13.4	18.3	25	36
13	Chevrolet	Corsica	Compact	11.4	11.4	11.4	25	34
14	Chevrolet	Camaro	Sporty	13.4	15.1	16.8	19	28
15	Chevrolet	Lumina	Midsize	13.4	15.9	18.4	21	29
16	Chevrolet	Lumina_APV	Van	14.7	16.3	18	18	23
17	Chevrolet	Astro	Van	14.7	16.6	18.6	15	20
18	Chevrolet	Caprice	Large	18	18.8	19.6	17	26
19	Chevrolet	Corvette	Sporty	34.6	38	41.5	17	25
20	Chrysler	Concorde	Large	18.4	18.4	18.4	20	28

Correlation Plot



Surface Fitting Statlet



Design of Experiments - Computer Generated Designs

Computer Generated Designs

	BLOCK	Factor_A	Factor_B	Factor_C
1	1	0.0	1.0	0.0
2	1	-1.0	1.0	1.0
3	1	0.0	0.0	0.0
4	1	0.0	-1.0	0.0
5	1	0.0	0.0	1.0
6	1	-1.0	1.0	-1.0
7	1	0.0	0.0	-1.0
8	1	-1.0	-1.0	-1.0
9	1	1.0	-1.0	1.0
10	1	1.0	0.0	0.0
11	1	1.0	-1.0	-1.0
12	1	0.0	0.0	0.0
13	1	-1.0	-1.0	1.0
14	1	1.0	1.0	1.0
15	1	-1.0	0.0	0.0
16	1	1.0	1.0	-1.0
17				
18				
19				
20				
21				
22				

Optimize

- I-efficiency
- D-efficiency
- A-efficiency
- G-efficiency

Display

- Original units
- Coded units

Randomize run order

Number of coefficients: 10

Number of base runs:

Number of replicates:

Number of centerpoints:

Group runs in blocks of size:

Average prediction variance: 0.340517

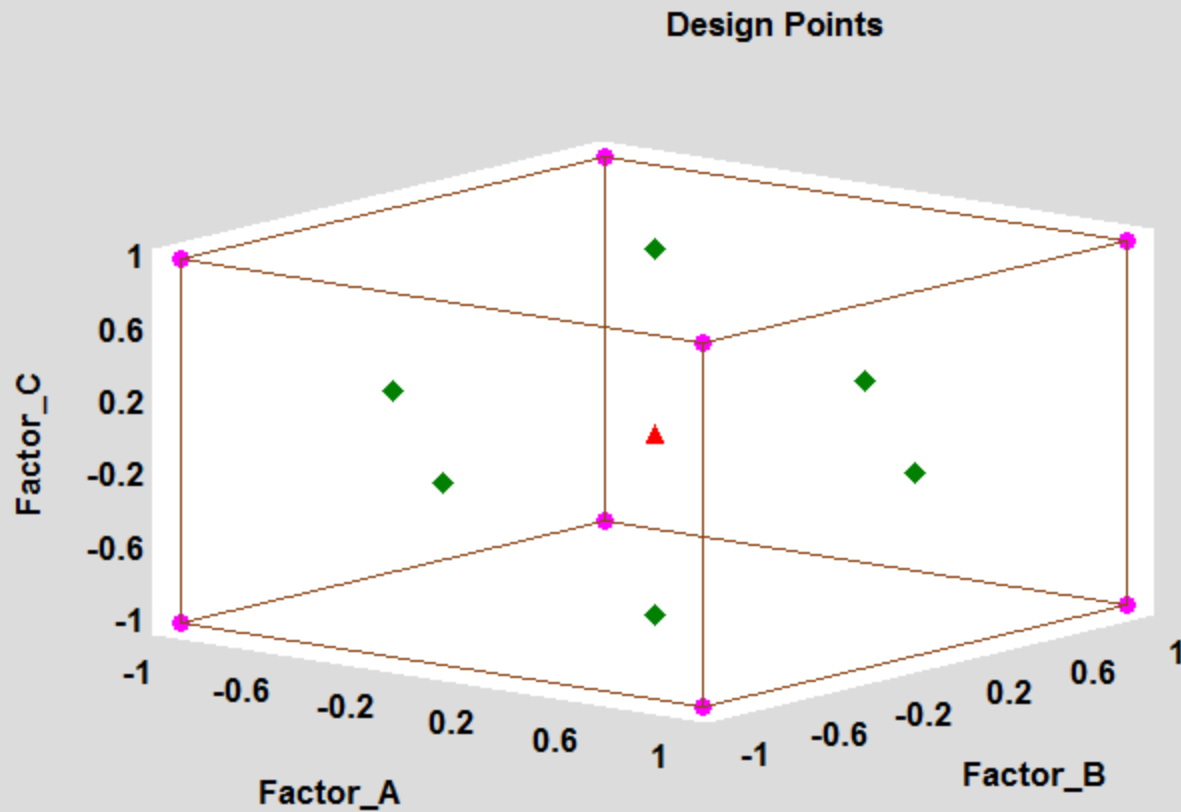
D-efficiency: 43.00%

A-efficiency: 30.68%

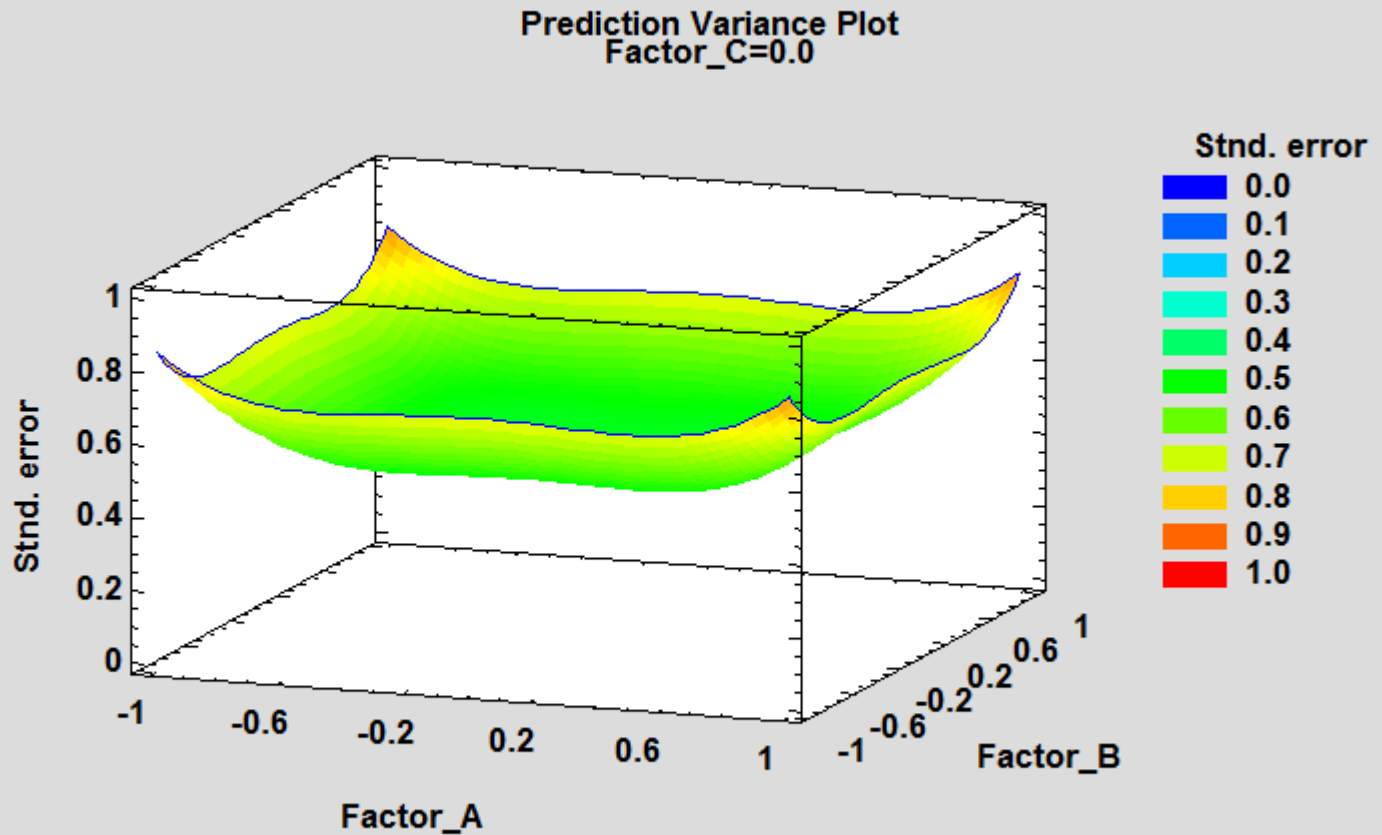
Create Advanced

OK Cancel Help

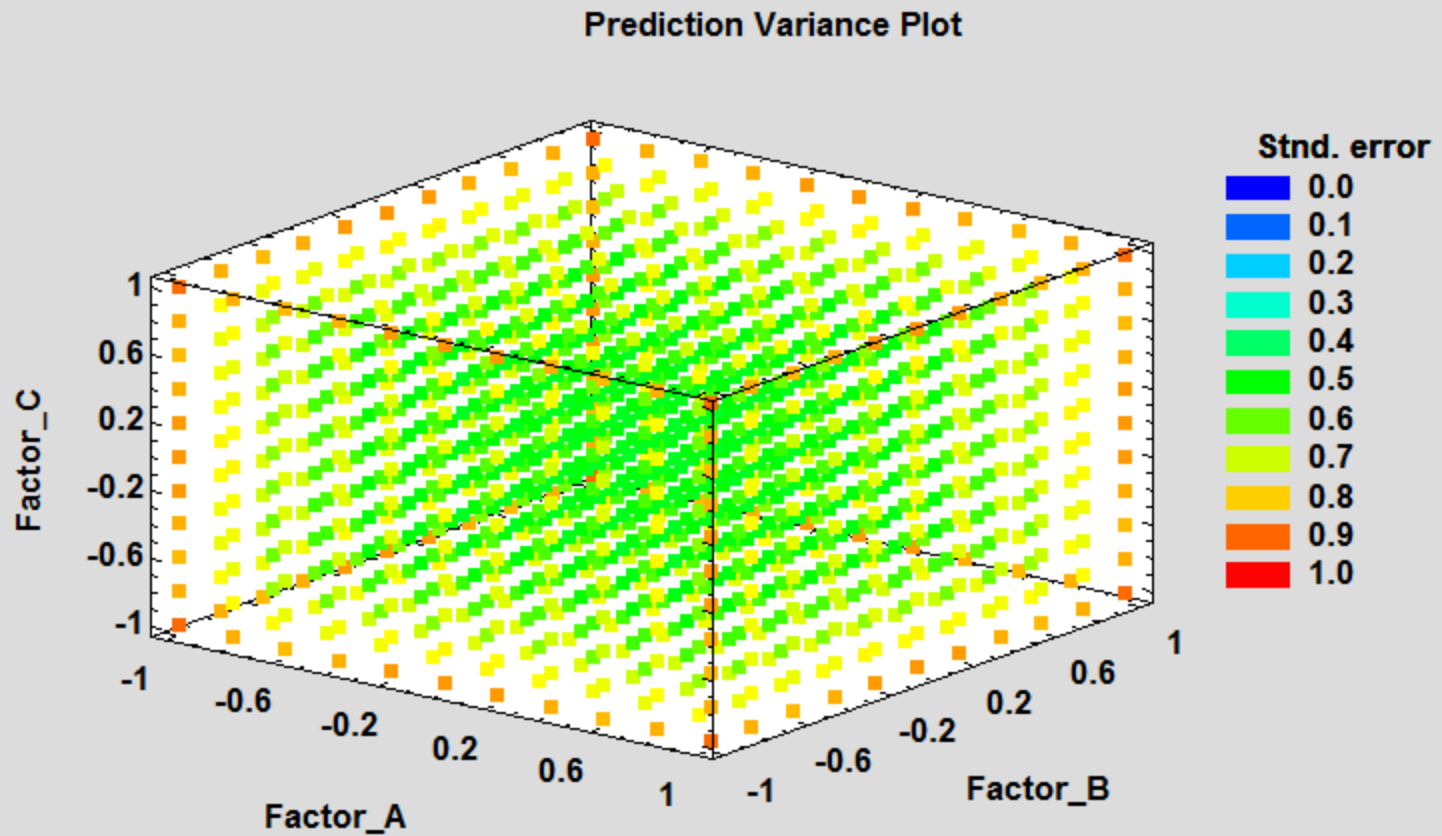
Generated Design Points



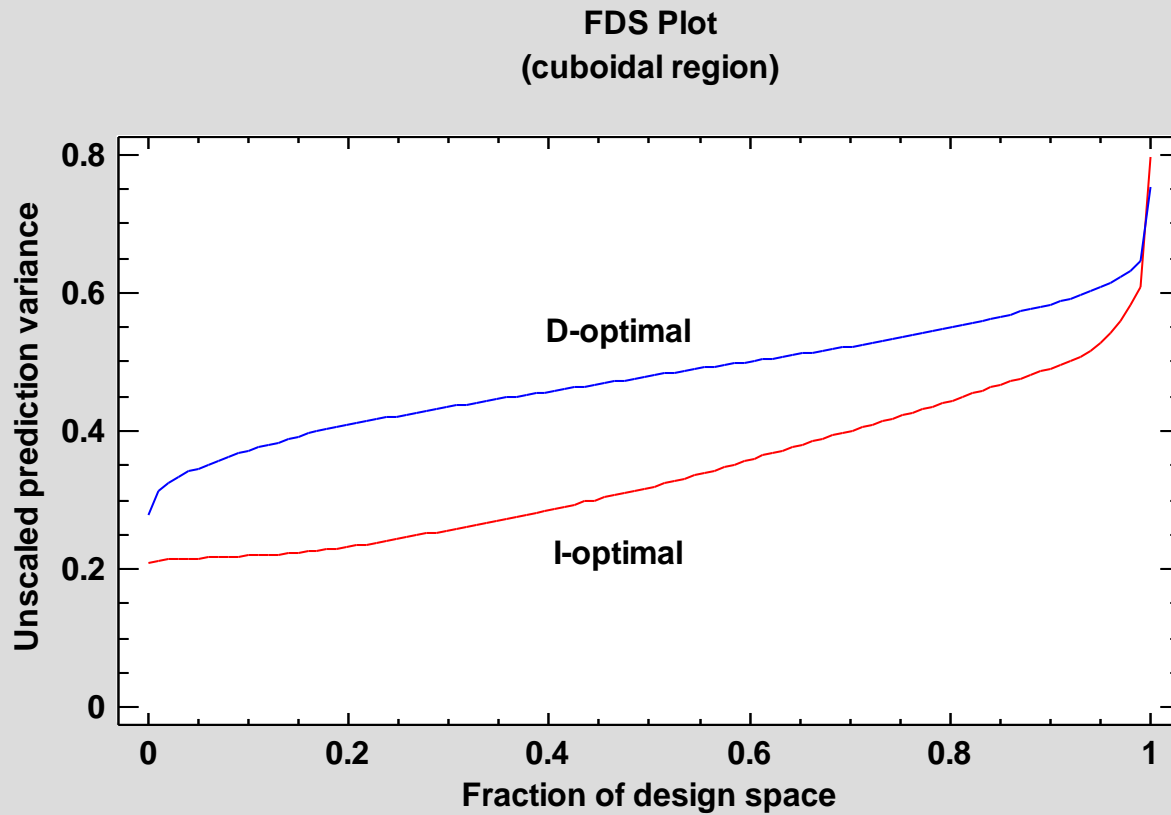
DOE - Prediction Variance Plot



DOE - Prediction Variance Mesh Plot



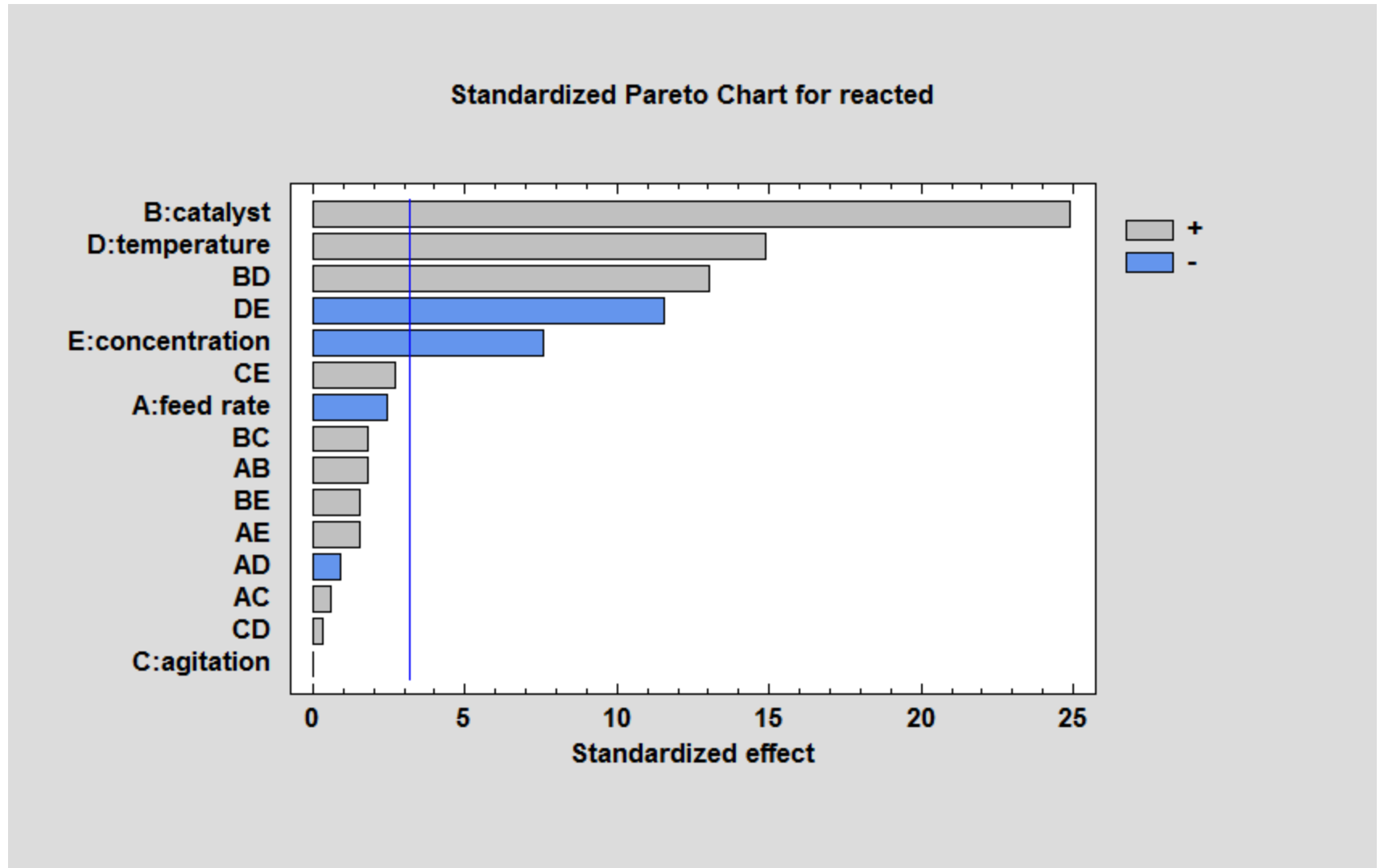
DOE - Fraction of Design Space Plot



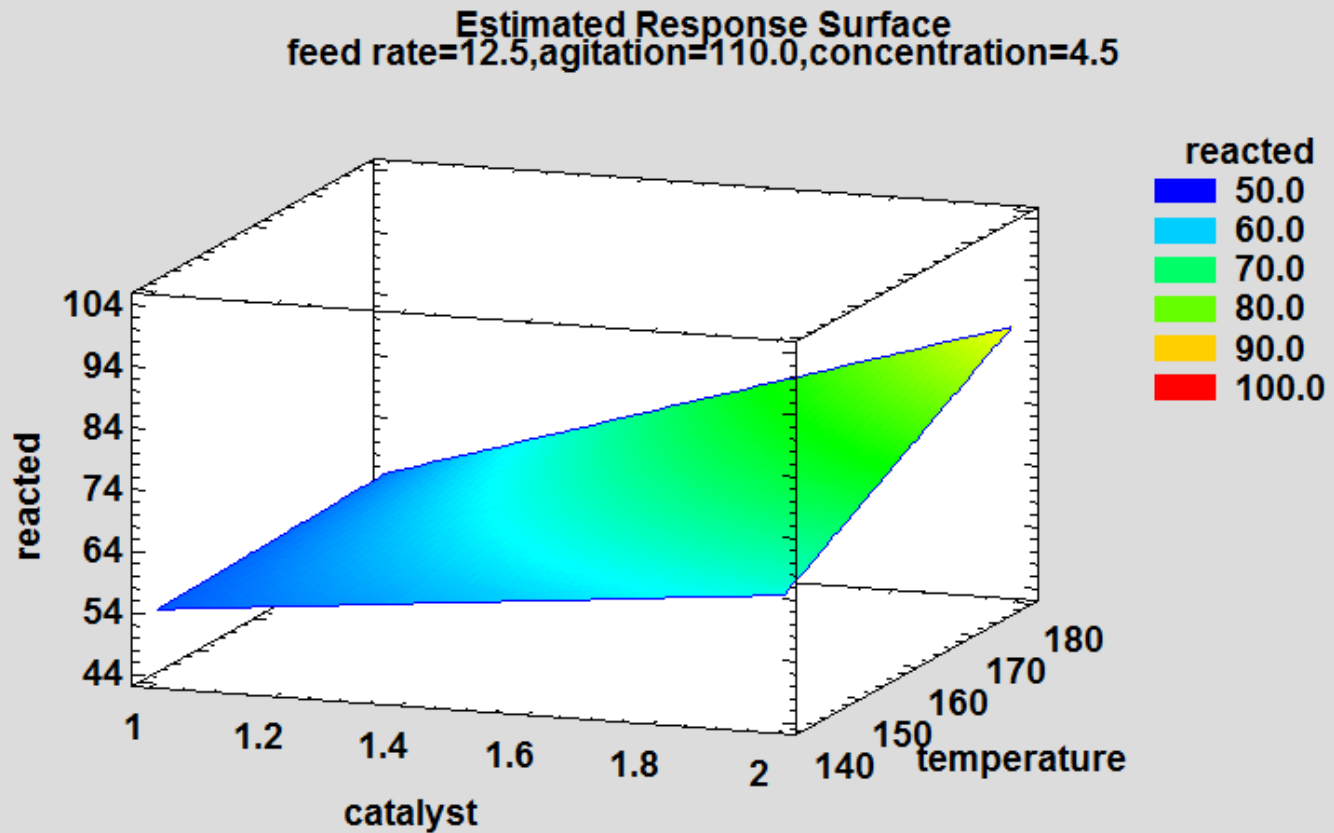
Design of Experiments - Analyze Data

	BLOCK	feed rate liters/min	catalyst %	agitation rpm	temperature degrees	concentration %	reacted %
1	1	12.5	1.5	110.0	160.0	4.5	65
2	1	10.0	1.0	100.0	140.0	6.0	56
3	1	15.0	1.0	100.0	140.0	3.0	53
4	1	10.0	2.0	100.0	140.0	3.0	63
5	1	15.0	2.0	100.0	140.0	6.0	65
6	1	10.0	1.0	120.0	140.0	3.0	53
7	1	15.0	1.0	120.0	140.0	6.0	55
8	1	10.0	2.0	120.0	140.0	6.0	67
9	1	15.0	2.0	120.0	140.0	3.0	61
10	1	12.5	1.5	110.0	160.0	4.5	67
11	1	10.0	1.0	100.0	180.0	3.0	69
12	1	15.0	1.0	100.0	180.0	6.0	45
13	1	10.0	2.0	100.0	180.0	6.0	78
14	1	15.0	2.0	100.0	180.0	3.0	93
15	1	10.0	1.0	120.0	180.0	6.0	49
16	1	15.0	1.0	120.0	180.0	3.0	60
17	1	10.0	2.0	120.0	180.0	3.0	95
18	1	15.0	2.0	120.0	180.0	6.0	82
19	1	12.5	1.5	110.0	160.0	4.5	63

Pareto Chart of Effects

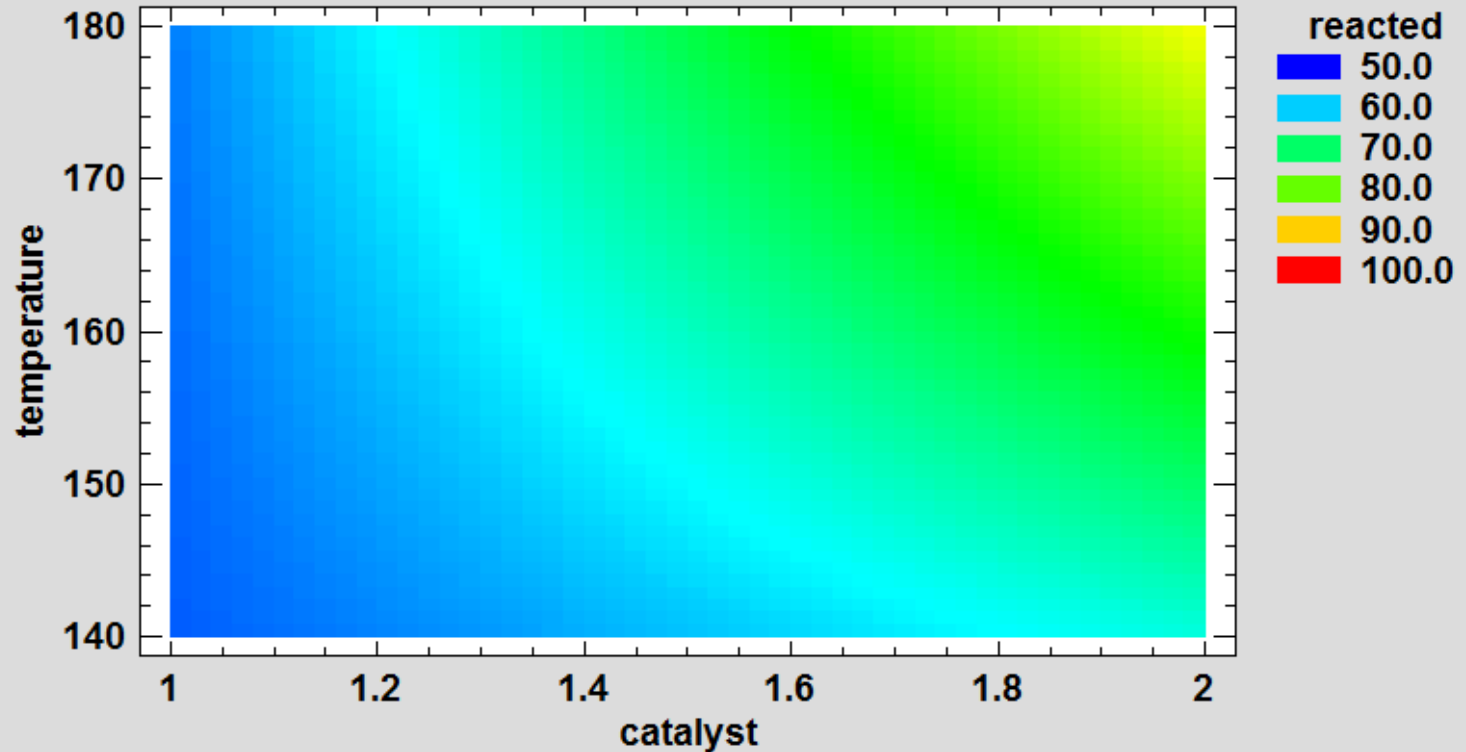


Gradient Surface Plot

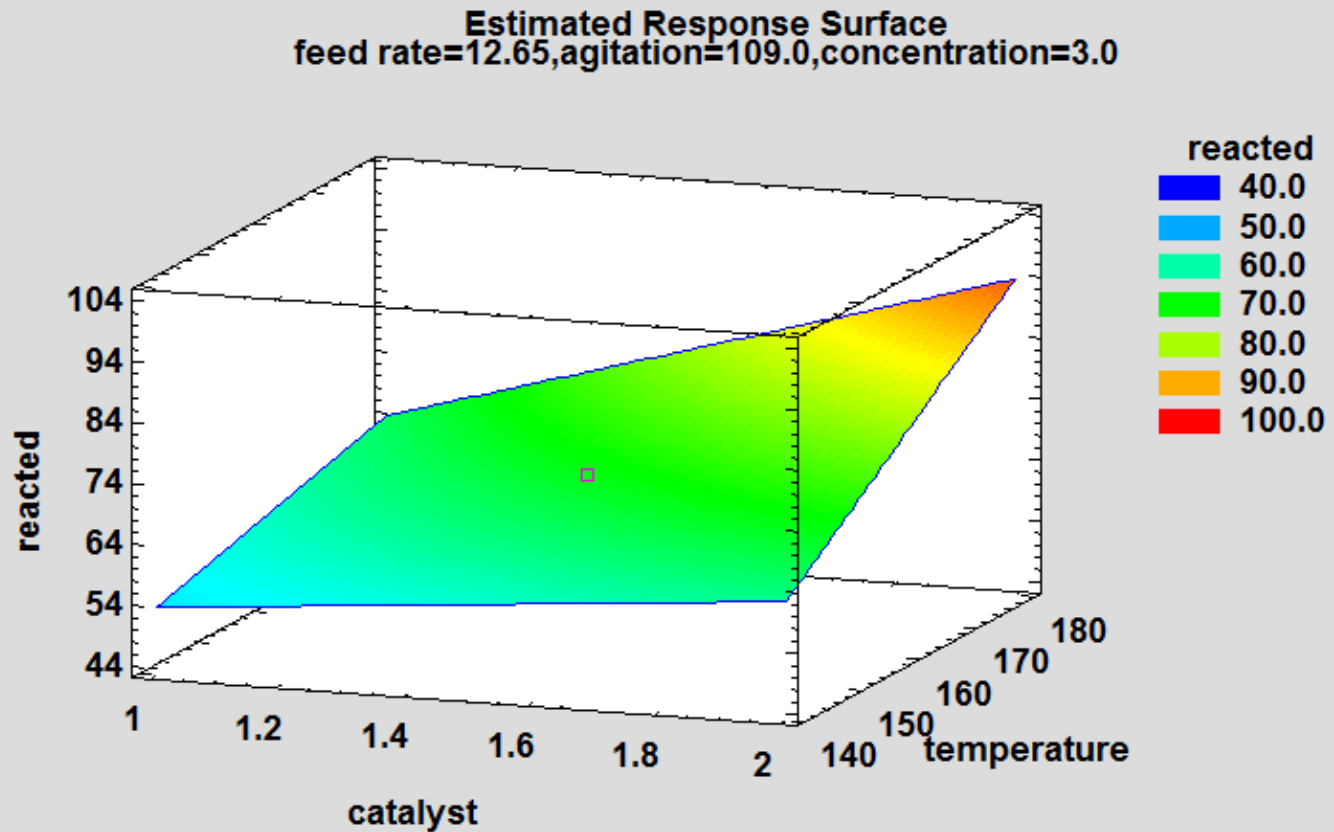


Gradient Contour Plot

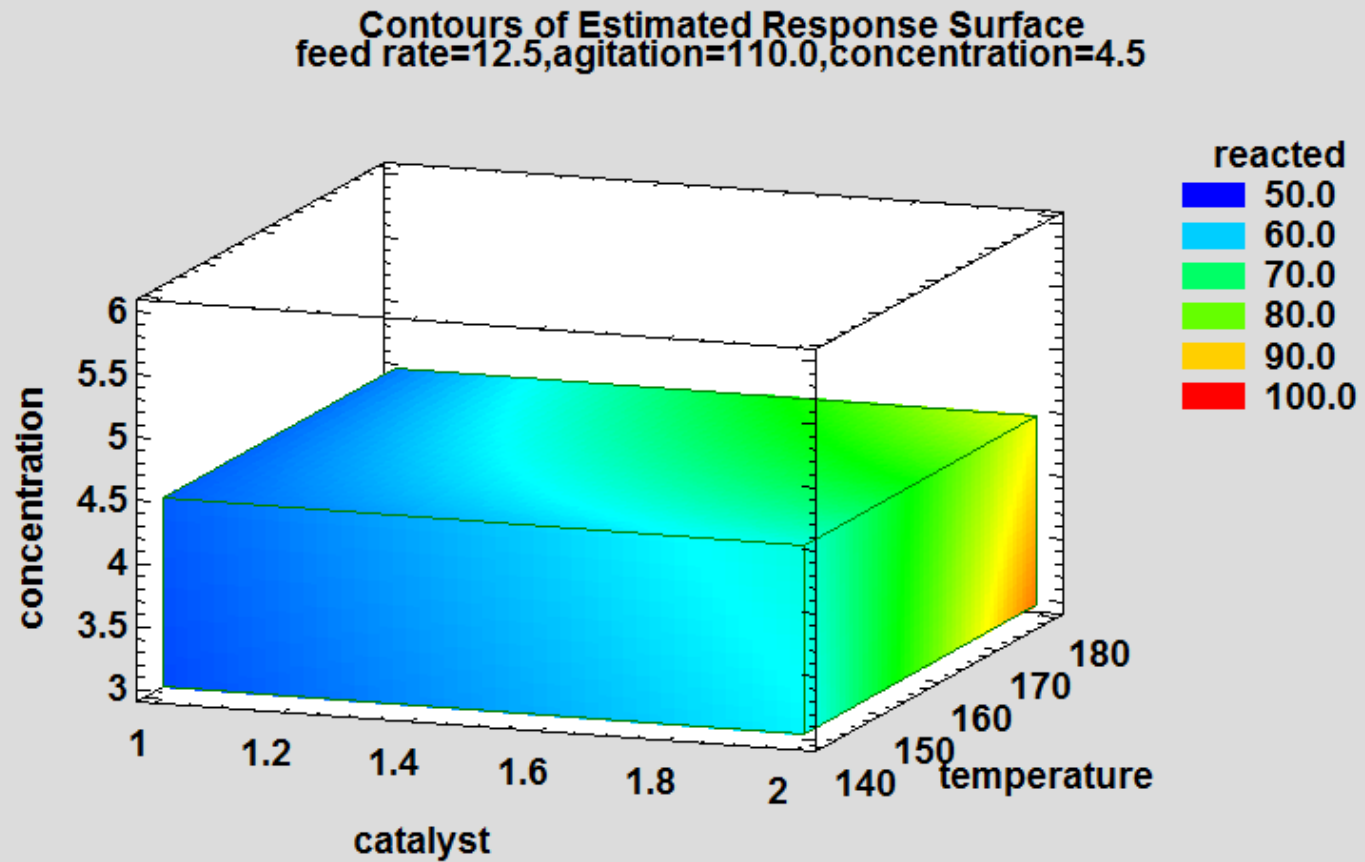
Contours of Estimated Response Surface
feed rate=12.5,agitation=110.0,concentration=4.5



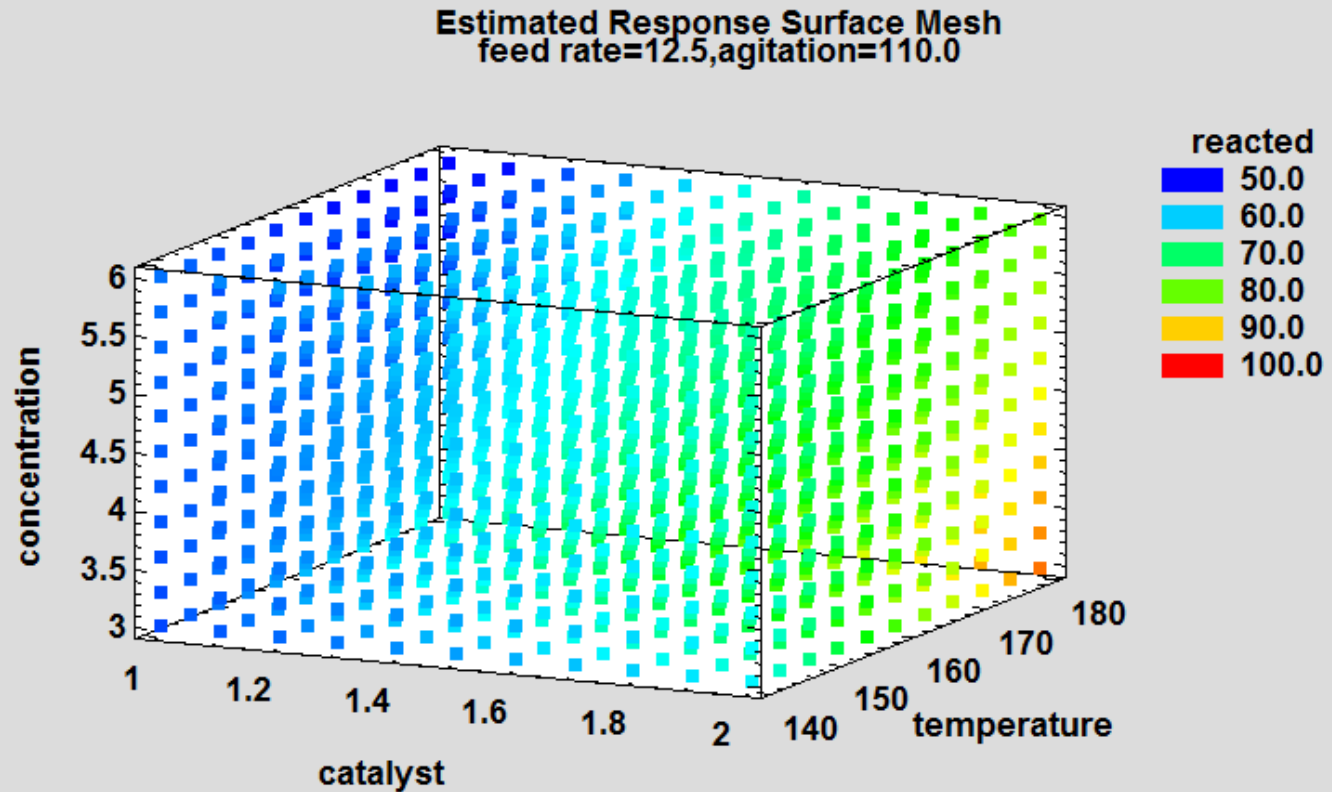
Response Surface Explorer



3-D Contour Plot



3-D Mesh Plot

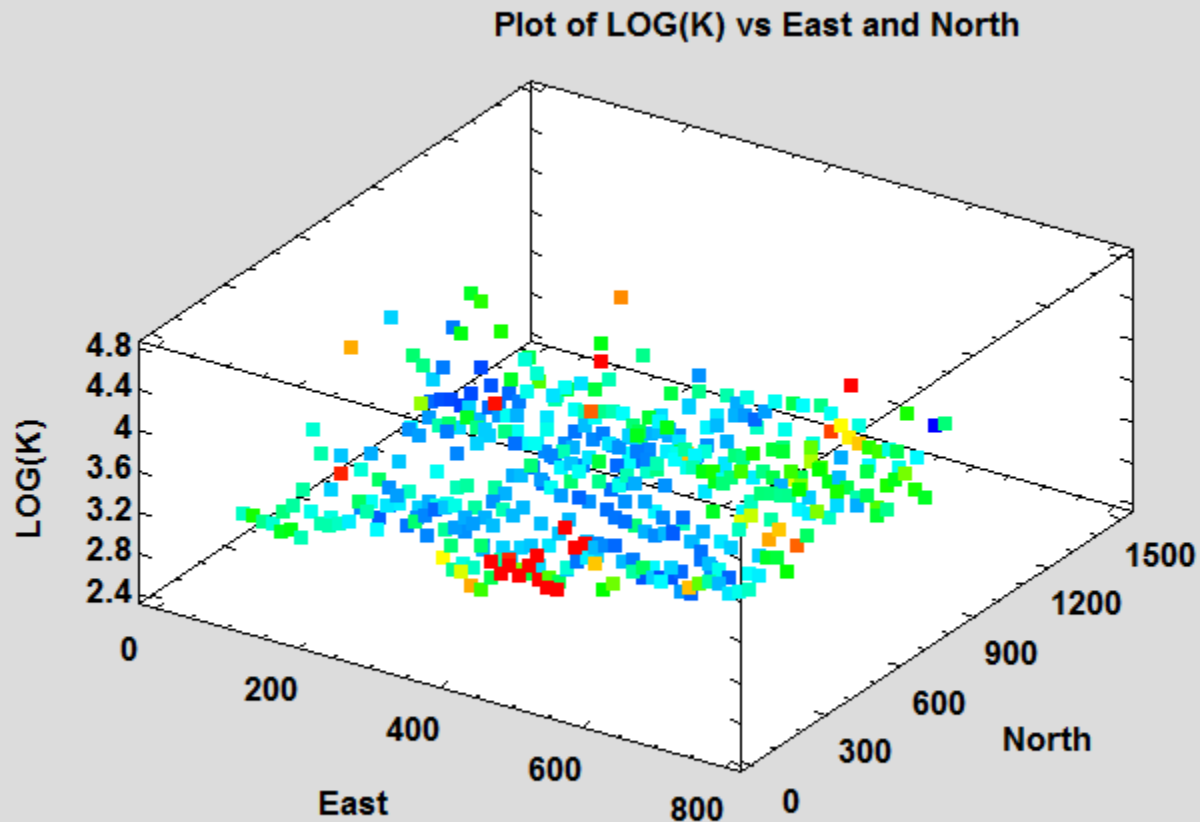


Geophysical Data

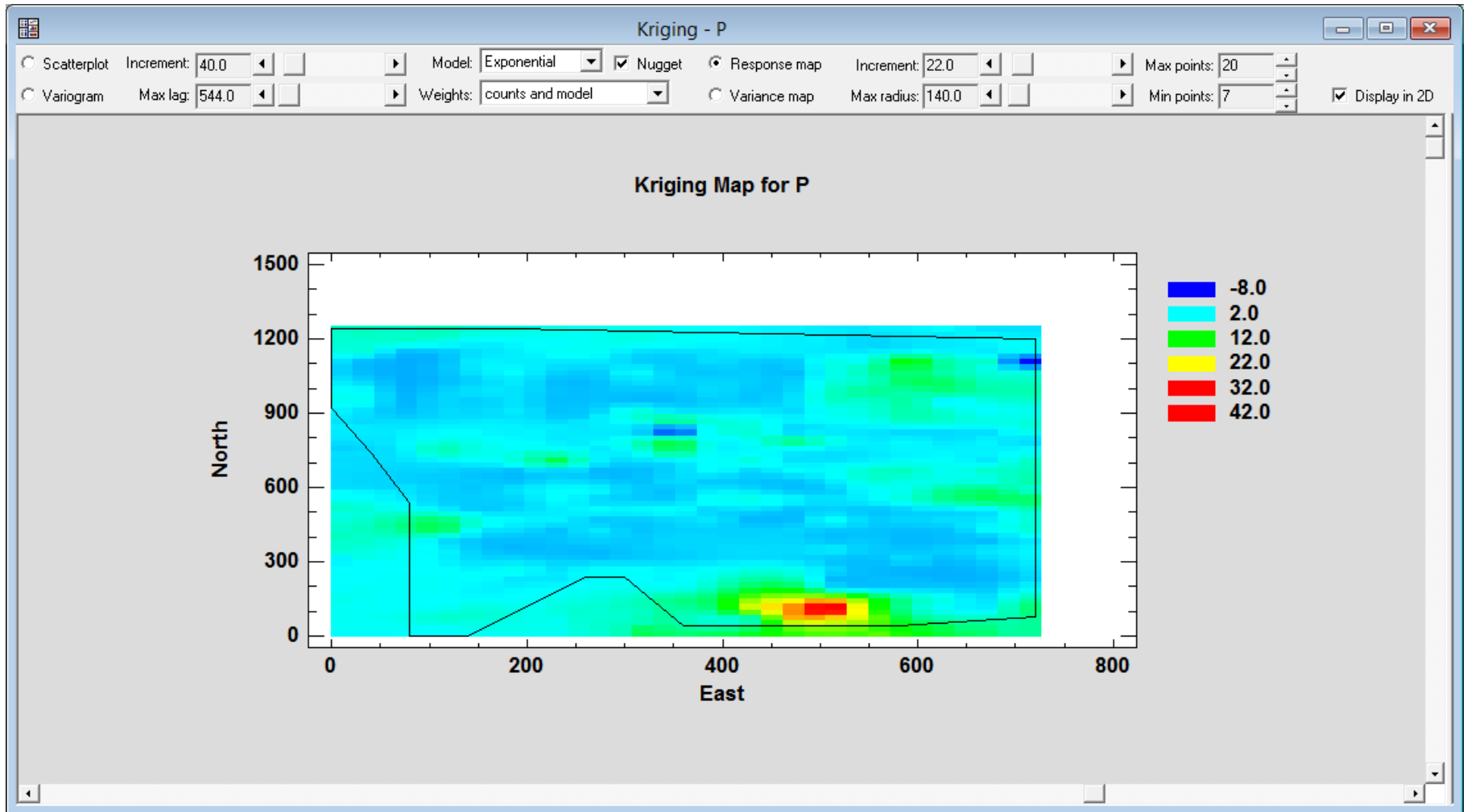
Soil samples from Brooms Barn at Rothamsted Experimental Center

	East	North	K	pH	P	X1 Boundary	X2 Boundary
1	20	940	26.0	7.2	5.5	0	1240
2	20	980	22.0	7.2	5.2	0	920
3	20	1020	18.0	6.8	2.6	40	740
4	20	1060	19.0	6.4	1.3	80	540
5	20	1100	26.0	6.1	1.3	80	0
6	20	1140	23.0	6.6	6.9	140	0
7	20	1180	32.0	7.8	6.6	220	160
8	20	1220	28.0	8.0	7.8	260	240
9	60	740	55.0	6.8	2.6	300	240
10	60	900	19.0	6.0	1.0	360	40
11	60	940	18.0	5.6	0.6	580	40
12	60	980	17.0	5.5	0.5	720	80
13	60	1020	15.0	5.7	0.4	720	1200
14	60	1060	16.0	5.6	0.5	180	1240
15	60	1100	19.0	6.4	0.5	0	1240
16	60	1140	15.0	6.7	0.7		
17	60	1180	24.0	7.9	7.5		
18	60	1220	14.0	8.2	6.6		
19	100	20	28.0	8.2	4.2		
20	100	60	26.0	8.2	7.5		

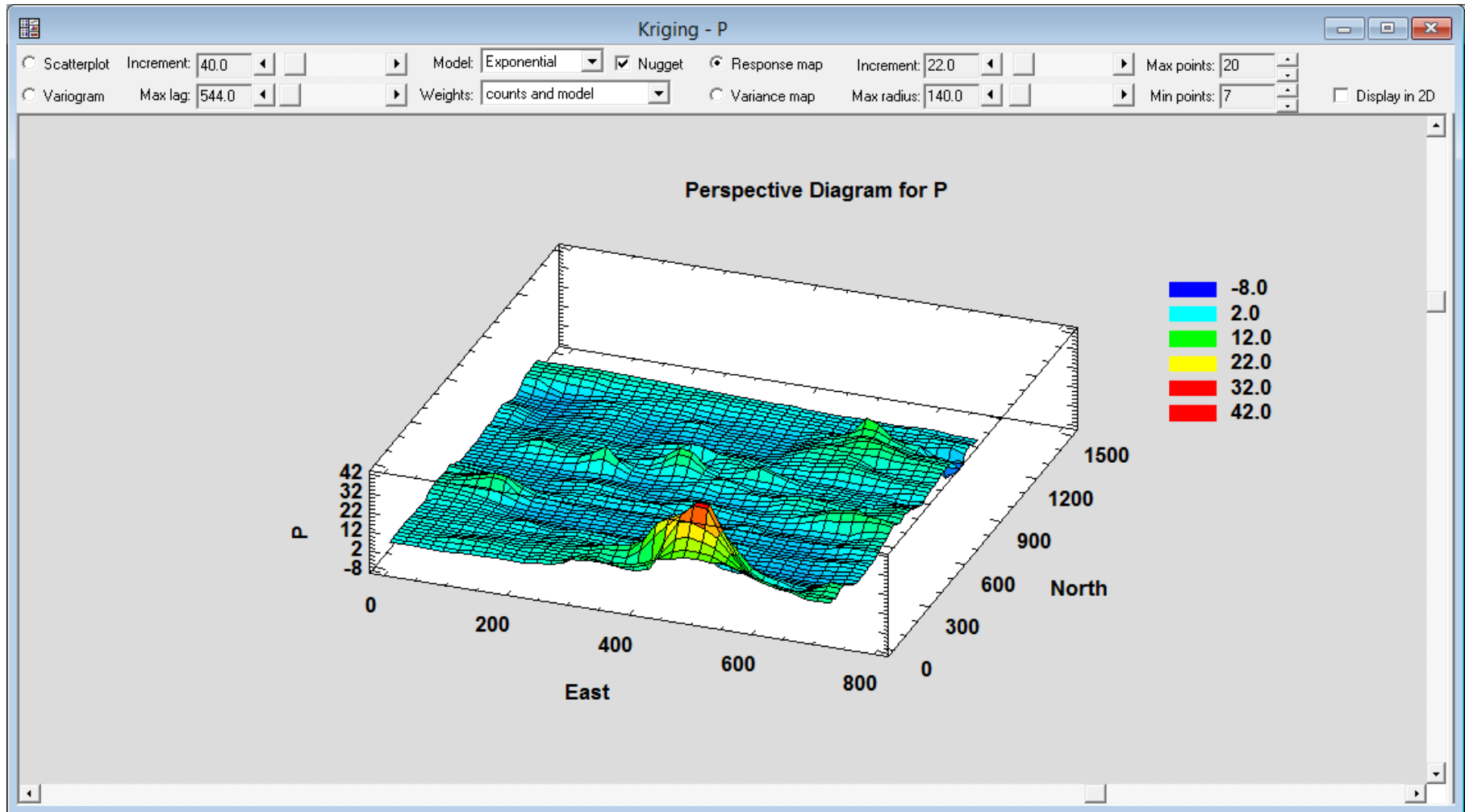
Gradient Brushing



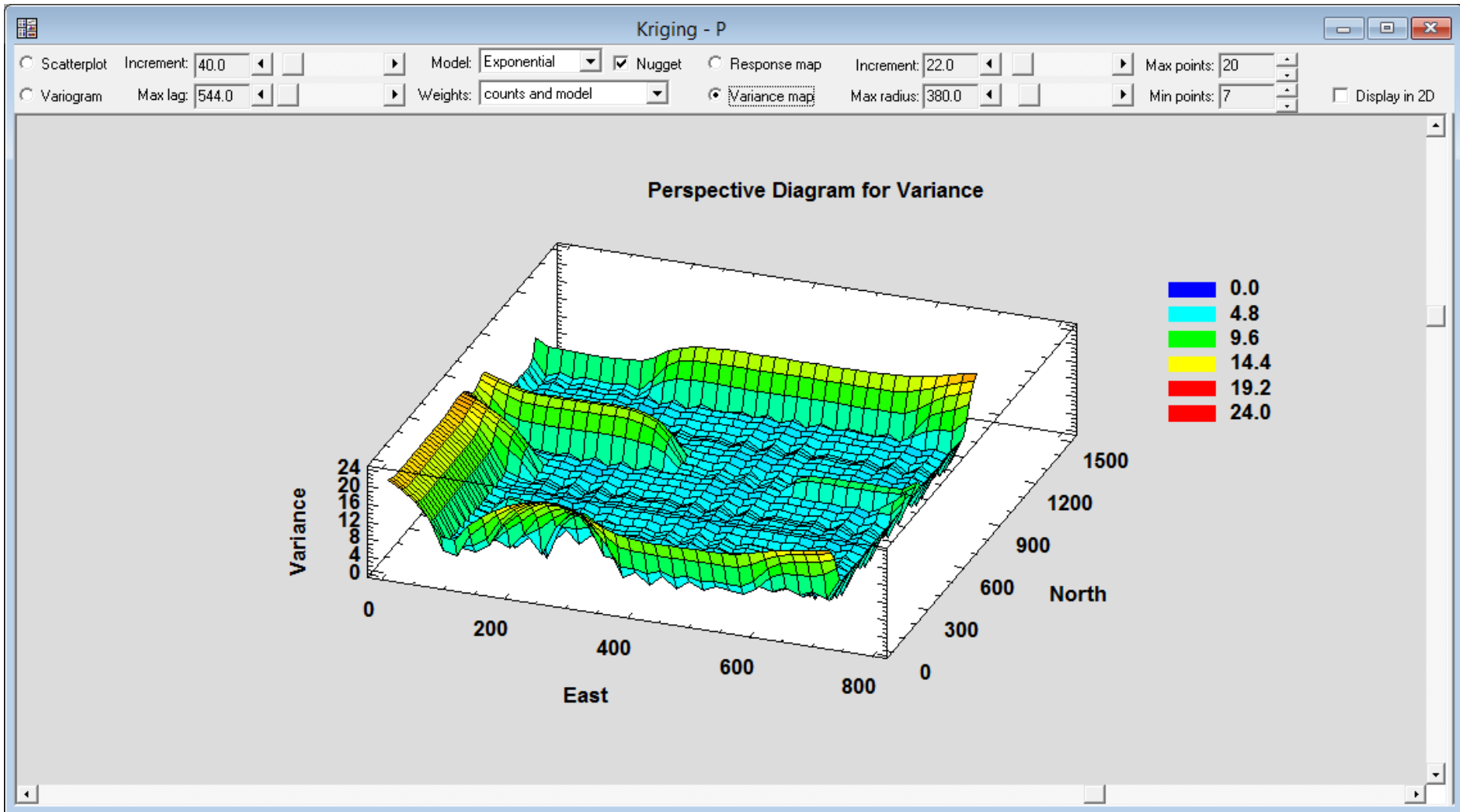
2-D Response Map



3-D Response Map



Variance Map

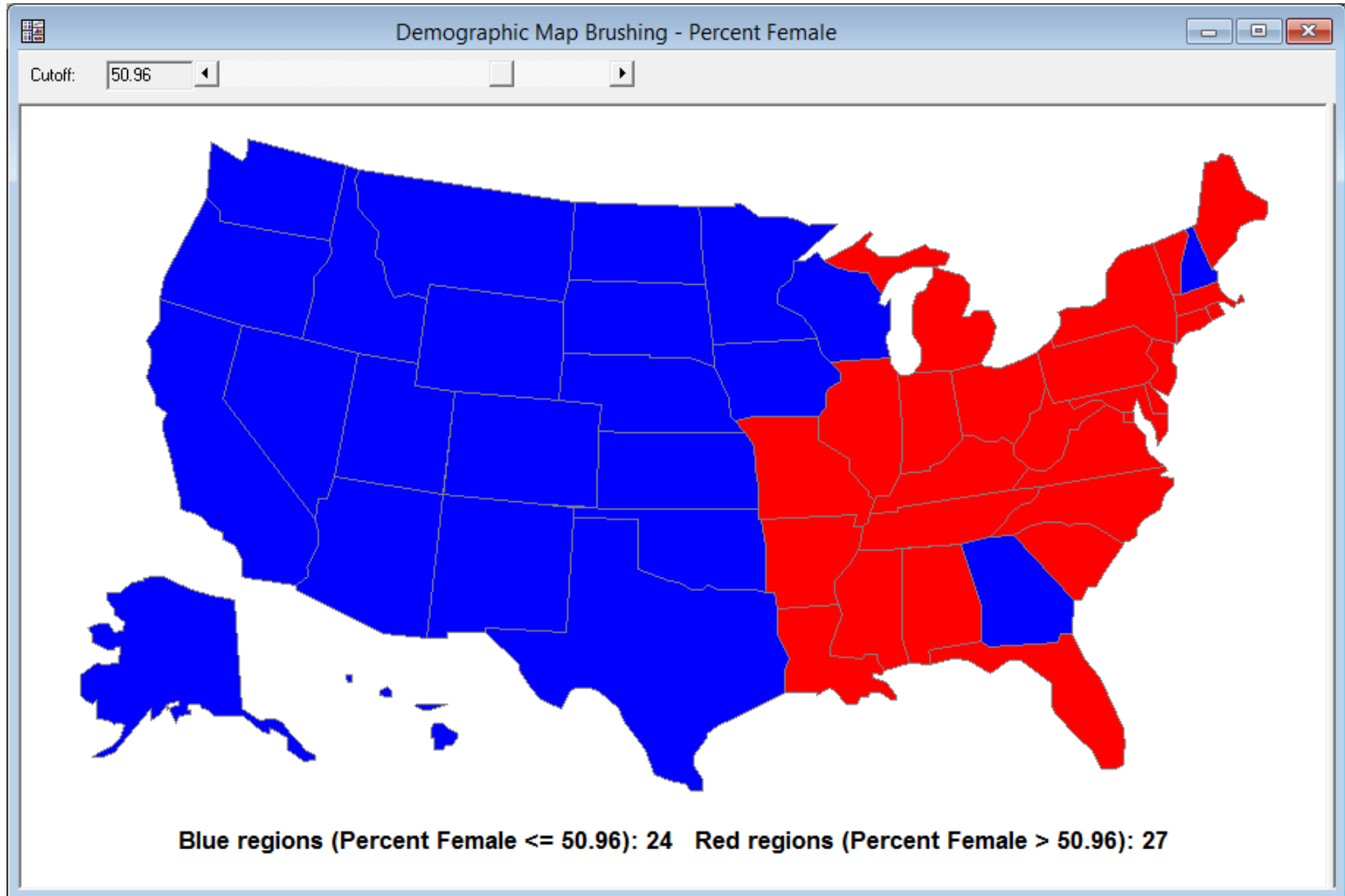


Demographic Maps

Data for 50 states and District of Columbia

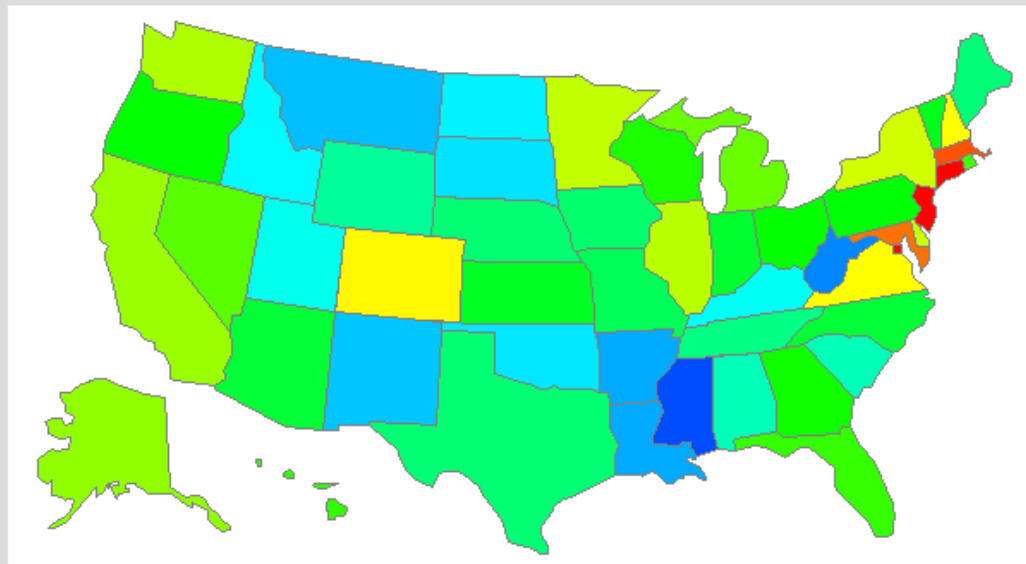
C:\Data\Statistical practice\census2006.sgd										
	State	Area	Population	Population Density	Mean Elevation	Median Age	Percent Female	Per Capita Income	Crime rate	Highest Temperature
		sq. mi.		per square mile	feet	years		U.S. dollars	violent crimes per 100,000	on record
1	Alabama	52419	4447100.00	87.6	500	35.8	51.7	18819	426.6	112
2	Alaska	663267	626932.00	1.1	1900	32.4	48.3	22660	634.5	100
3	Arizona	113998	5130632.00	45.2	4100	34.2	50.1	20275	504.1	128
4	Arkansas	53179	2673400.00	51.3	650	36	51.2	16904	499.1	120
5	California	158302	33871648.00	217.1	2900	33.3	50.2	22711	551.8	134
6	Colorado	104185	4301261.00	41.5	6800	34.3	49.6	24049	373.5	118
7	Connecticut	5543	3405565.00	702.9	500	37.4	51.6	28766	286.3	106
8	Delaware	2490	783600.00	401.1	60	36	51.4	23305	568.4	110
9	District of Columbia	68.3	572059.00		150	34.6	52.9	28659	1371.2	106
10	Florida	58560	15982378.00	296.4	100	38.7	51.2	21557	711.3	109
11	Georgia	58876	8186453.00	141.4	600	33.4	50.8	21154	455.5	112
12	Hawaii	6450	1211537.00	188.6	3030	36.2	49.8	21525	254.4	100
13	Idaho	83557	1293953.00	15.6	5000	33.2	49.9	17841	244.9	108
14	Illinois	56400	12419293.00	223.4	600	34.7	51	23104	542.9	117
15	Indiana	36291	6080485.00	169.5	700	35.2	51	20397	325.4	116
16	Iowa	56290	2926324.00	52.4	1100	36.6	50.9	19674	270.9	118
17	Kansas	82264	2688418.00	32.9	2000	35.2	50.6	20506	374.5	121
18	Kentucky	40409	4041769.00	101.7	750	35.9	51.1	18093	244.9	114
19	Louisiana	48523	4468976.00	102.6	100	34	51.6	16912	638.7	114
20	Maine	33215	1274923.00	41.3	600	38.6	51.3	19533	103.5	105
21	Maryland	10577	5296486.00	541.9	350	36	51.7	25614	700.5	109
22	Massachusetts	8257	6349097.00	809.8	500	36.5	51.8	25952	458.8	107

Brushing Maps



Gradient Map

Per Capita Income

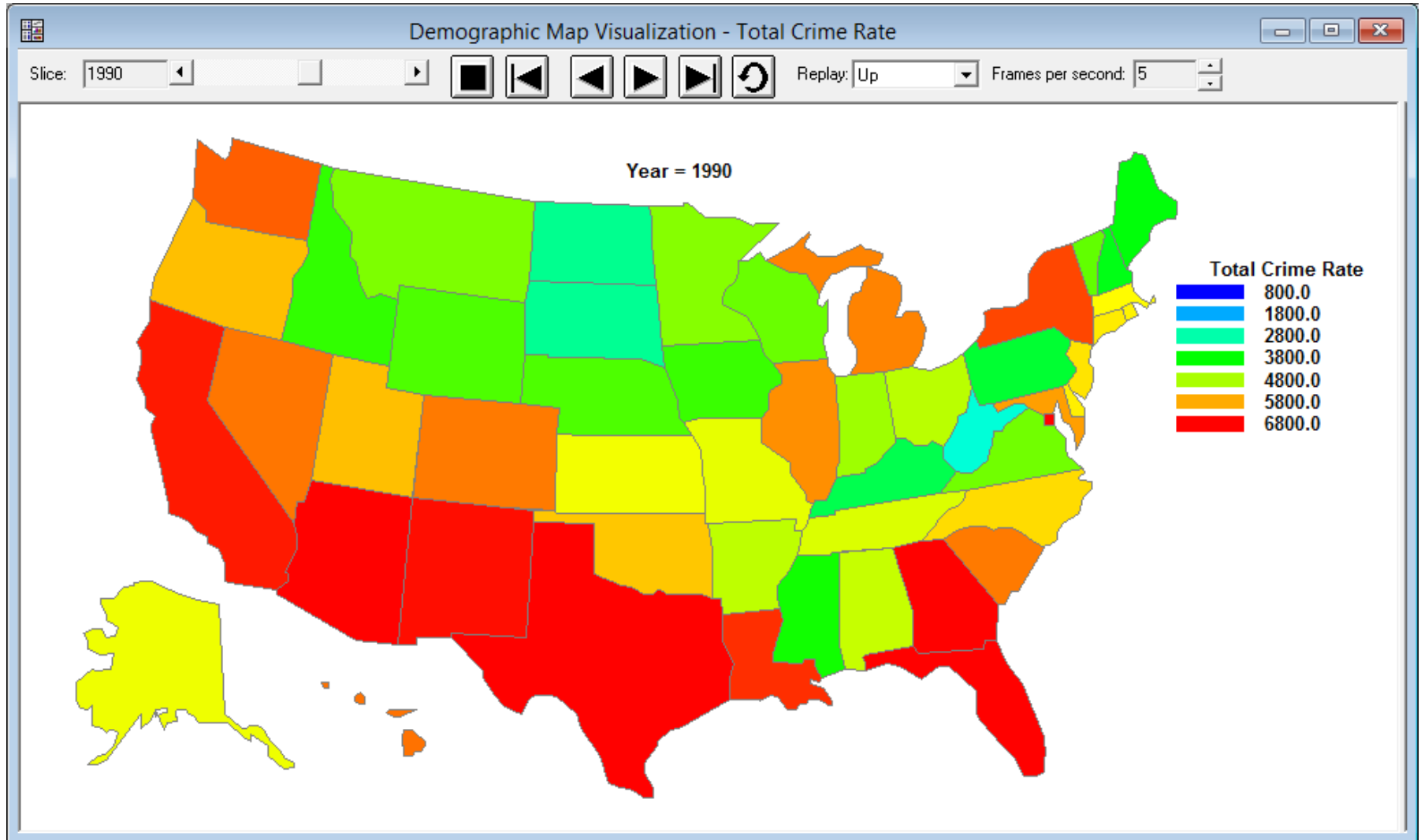


Visualization over Time

Crime rates for 50 states and D.C. between 1965 and 2010

	State	Year	Population	Total Crime Rate per 100,000 population	Violent Crime Rate total	Murder	Forcible Rape	Robbery	Aggravated Assault	Property Crime Rate total
1	Alaska	1965	253000	2603.6	149.0	6.3	17.8	39.9	85.0	2454.5
2	Alaska	1966	272000	2785.7	150.4	12.9	19.5	36.0	82.0	2635.3
3	Alaska	1967	272000	2884.6	160.7	9.6	17.6	35.3	98.2	2723.9
4	Alaska	1968	277000	3320.9	175.5	10.5	21.7	52.7	90.6	3145.5
5	Alaska	1969	282000	3880.1	221.3	10.6	29.4	67.4	113.8	3658.9
6	Alaska	1970	302173	3801.8	278.0	12.2	26.1	71.8	167.8	3523.8
7	Alaska	1971	313000	4164.5	355.3	13.4	43.5	67.1	231.3	3809.3
8	Alaska	1972	325000	4478.5	370.5	9.5	41.8	66.5	252.6	4108.0
9	Alaska	1973	330000	4943.3	384.5	10.0	44.5	67.0	263.0	4558.8
10	Alaska	1974	337000	5239.8	453.1	13.6	49.3	88.4	301.8	4786.6
11	Alaska	1975	352000	6196.6	539.8	12.2	44.6	129.5	353.4	5656.8
12	Alaska	1976	382000	6220.7	540.1	11.3	46.9	124.9	357.1	5680.6
13	Alaska	1977	407000	5898.0	443.2	10.8	51.6	96.8	284.0	5454.8
14	Alaska	1978	403000	6046.2	441.9	12.9	55.6	91.3	282.1	5604.2
15	Alaska	1979	406000	6203.7	491.1	13.3	71.9	109.6	296.3	5712.6
16	Alaska	1980	440142	5645.7	436.0	8.9	56.8	81.8	288.5	5209.7
17	Alaska	1981	412000	6594.9	615.8	14.6	102.2	114.6	384.5	5979.1
18	Alaska	1982	438000	6212.6	623.7	18.5	85.4	133.8	386.1	5588.8
19	Alaska	1983	479000	6018.6	613.8	13.8	101.5	97.1	401.5	5404.8
20	Alaska	1984	500000	6115.2	621.6	11.6	91.6	109.4	409.0	5493.6
21	Alaska	1985	521000	5877.0	581.8	9.8	77.2	92.9	401.9	5295.2
22	Alaska	1986	534000	6245.9	570.4	8.6	72.7	88.0	401.1	5675.5
23	Alaska	1987	525000	5377.5	455.4	10.1	65.0	73.1	307.2	4922.1
24	Alaska	1988	513000	4921.6	522.8	5.7	57.7	72.9	386.5	4398.8
25	Alaska	1989	527000	4779.9	497.7	8.0	52.9	67.6	369.3	4282.2
26	Alaska	1990	550043	5152.7	524.5	7.5	72.9	76.7	367.4	4628.2

Demographic Map Visualizer



Visualizing Multivariate Data

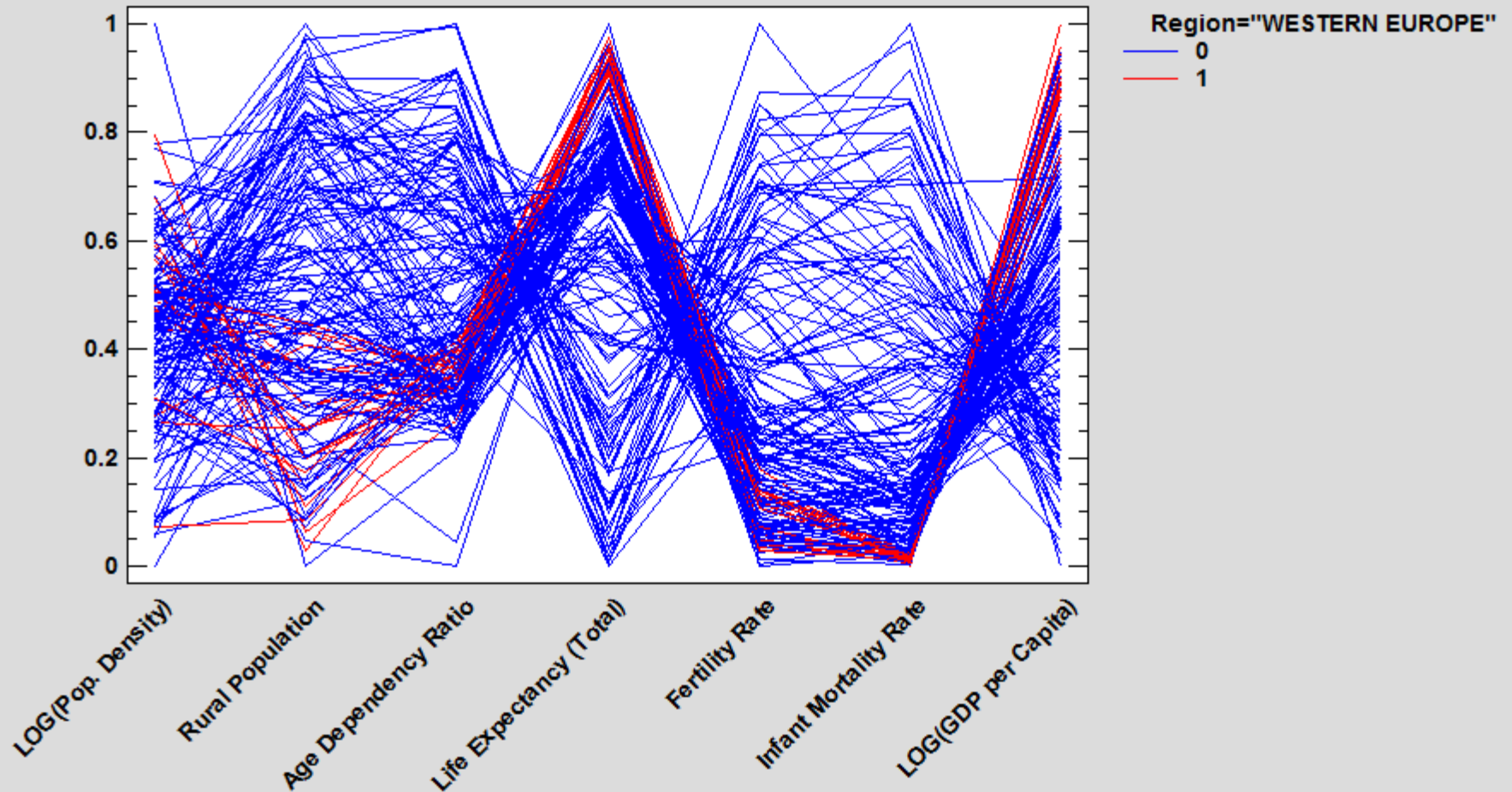
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	Country Code	Country	Region	Year	Population	Pop. Density	Rural Population	Female Percentage	Age Dependency Ratio	Life Expectancy (Total)
					total	people per sq. km of land area	% of total population	% of total population	% of working-age population	years at birth
1	ABW	Aruba	LATIN AMER. & CARIB	2009	106612	592.29	53.16	52.59	40.68	74.83
2	AFG	Afghanistan	ASIA (EX. NEAR EAST)	2009	33438329	51.27	75.58	48.26	96.09	47.9
3	AGO	Angola	SUB-SAHARAN AFRICA	2009	18555115	14.88	42.4	50.49	97.38	50.25
4	ALB	Albania	EASTERN EUROPE	2009	3192723	116.52	52.64	49.93	48.78	76.76
5	ARE	United Arab Emirates	NEAR EAST	2009	6938815	83	22.06	30.49	21.51	76.4
6	ARG	Argentina	LATIN AMER. & CARIB	2009	40062470	14.64	7.8	51.08	55.32	75.46
7	ARM	Armenia	C.W. OF IND. STATES	2009	3084979	108.32	36.22	53.45	46.27	73.65
8	AUS	Australia	OCEANIA	2009	21951700	2.86	11.08	50.22	47.79	81.54
9	AUT	Austria	WESTERN EUROPE	2009	8365275	101.46	32.62	51.24	47.64	80.08
10	AZE	Azerbaijan	C.W. OF IND. STATES	2009	8947150	108.29	47.94	50.6	38.47	70.32
11	BDI	Burundi	SUB-SAHARAN AFRICA	2009	8170853	318.18	89.3	50.97	70.23	49.42
12	BEL	Belgium	WESTERN EUROPE	2009	10796493	356.56	2.62	51	51.93	79.74
13	BEN	Benin	SUB-SAHARAN AFRICA	2009	8601771	77.76	58.4	50.74	88.33	55.17
14	BFA	Burkina Faso	SUB-SAHARAN AFRICA	2009	15984479	58.42	80.02	50.41	91.01	54.47
15	BGD	Bangladesh	ASIA (EX. NEAR EAST)	2009	147030145	1129.52	72.38	49.28	57.37	68.33
16	BGR	Bulgaria	EASTERN EUROPE	2009	7585131	69.84	28.6	51.63	44.9	73.41
17	BHR	Bahrain	NEAR EAST	2009	1169578	1538.92	11.44	38.03	29.5	74.89
18	BHS	Bahamas	LATIN AMER. & CARIB	2009	338358	33.8	16.1	51.12	42.28	74.98
19	BIH	Bosnia and Herzegovina	EASTERN EUROPE	2009	3767683	73.59	51.98	51.93	41.36	75.25
20	BLR	Belarus	C.W. OF IND. STATES	2009	9507000	46.86	26.12	53.47	40.24	70.41
21	BLZ	Belize	LATIN AMER. & CARIB	2009	333200	14.61	47.8	50.68	65.81	75.62
22	BOL	Bolivia	LATIN AMER. & CARIB	2009	9773441	9.02	33.96	50.15	69.88	65.96
23	BRA	Brazil	LATIN AMER. & CARIB	2009	193246610	22.84	13.96	50.77	48.65	72.76
24	BDR	Barbados	LATIN AMER. & CARIB	2009	272750	634.3	59.68	50.37	41.12	76.41

worldbank2009 B C

Parallel Coordinates Plot

Parallel Coordinates Plot



Star Glyphs

AGO	ALB	ARE	ARG	ARM	AUS	AUT	AZE	BDI	BEL	BEN	BFA	BGD
BGR	BHS	BIH	BLZ	BOL	BRA	BRB	BRN	BTN	BWA	CAF	CAN	CHE
CHL	CHN	CIV	CMR	COG	COL	COM	CPV	CRI	CYP	CZE	DEU	DJI
DNK	DOM	DZA	ECU	EGY	ERI	ESP	EST	ETH	FIN	FJI	FRA	FSM
GAB	GBR	GEO	GHA	GIN	GMB	GNB	GNQ	GRC	GRD	GTM	GUY	HND
HRV	HTI	HUN	IDN	IND	IRL	IRN	IRQ	ISL	ISR	ITA	JAM	JOR
JPN	KAZ	KEN	KGZ	KHM	KOR	LAO	LBN	LBR	LBY	LCA	LKA	LSO
LTU	LUX	LVA	MAR	MDA	MDG	MDV	MEX	MKD	MLI	MLT	MNE	MNG
MOZ	MRT	MUS	MWI	MYS	NAM	NER	NGA	NIC	NLD	NOR	NPL	NZL
OMN	PAK	PAN	PER	PHL	PNG	POL	PRT	PRY	QAT	ROM	RUS	RWA
SAU	SDN	SEN	SGP	SLB	SLE	SLV	SUR	SVK	SVN	SWE	SWZ	SYR
TCD	TGO	THA	TJK	TKM	TMP	TON	TTO	TUN	TUR	TZA	UGA	UKR
URY	USA	UZB	VCT	VEN	VNM	VUT	WSM	YEM	ZAF	ZAR	ZMB	ZWE

Region

	ASIA (EX. NEAR EAST)
	BALTICS
	C.W. OF IND. STATES
	EASTERN EUROPE
	LATIN AMER. & CARIB
	NEAR EAST
	NORTHERN AFRICA
	NORTHERN AMERICA
	OCEANIA
	SUB-SAHARAN AFRICA
	WESTERN EUROPE

Chernoff Faces

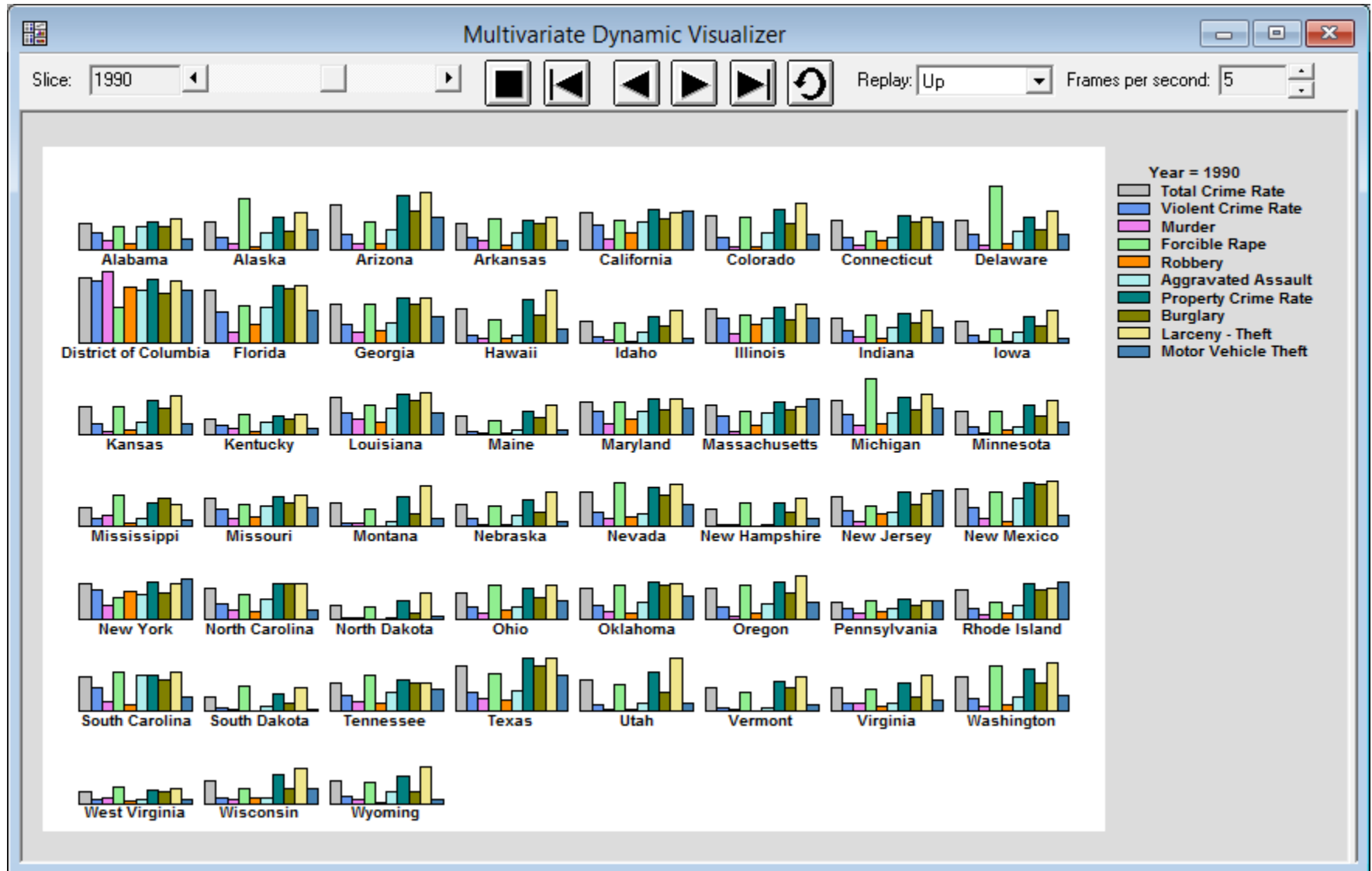


Multivariate Visualization over Time

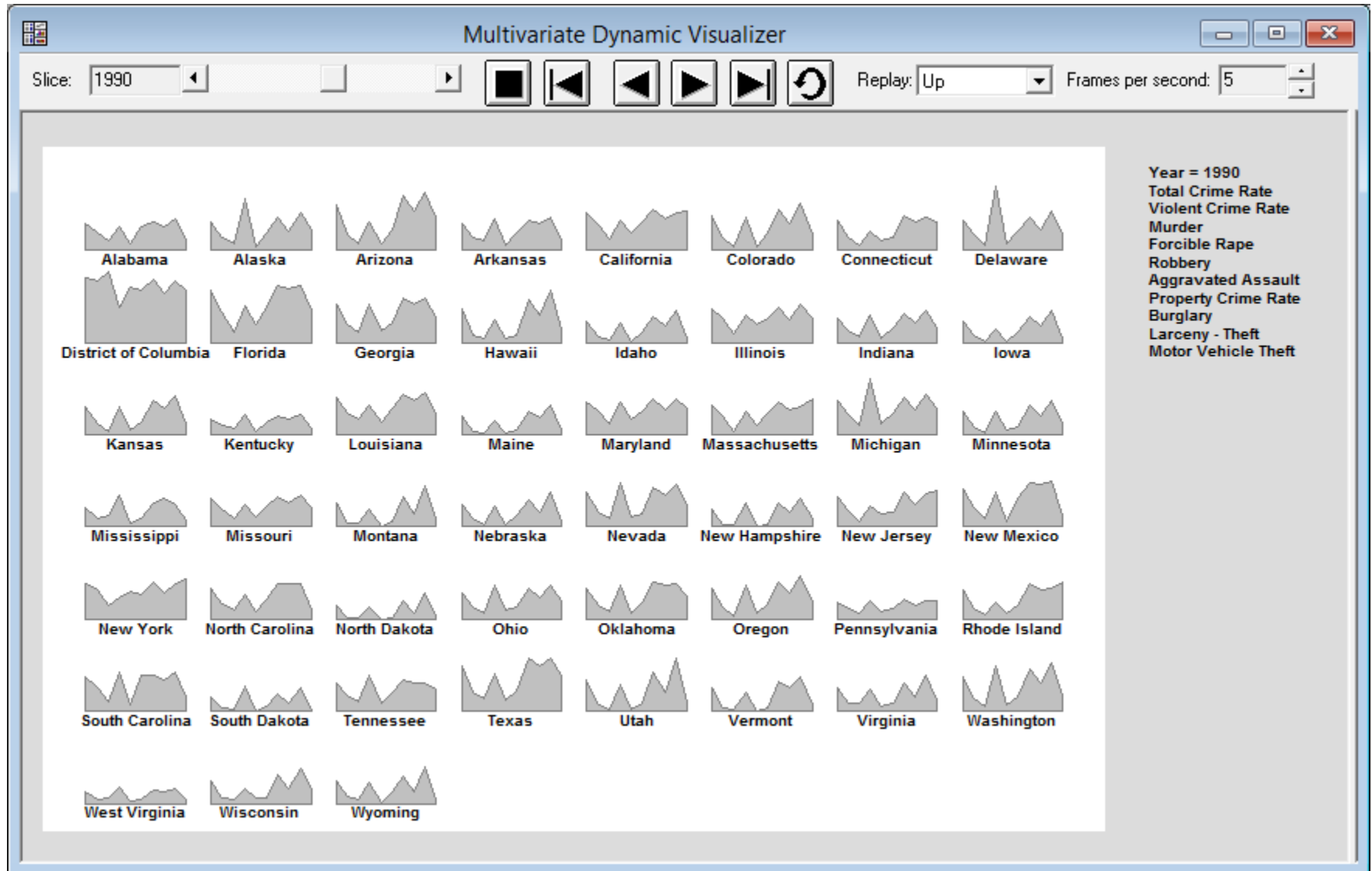
Crime rates for 50 states and D.C. between 1965 and 2010

	State	Year	Population	Total Crime Rate per 100,000 population	Violent Crime Rate total	Murder	Forcible Rape	Robbery	Aggravated Assault	Property Crime Rate total
1	Alaska	1965	253000	2603.6	149.0	6.3	17.8	39.9	85.0	2454.5
2	Alaska	1966	272000	2785.7	150.4	12.9	19.5	36.0	82.0	2635.3
3	Alaska	1967	272000	2884.6	160.7	9.6	17.6	35.3	98.2	2723.9
4	Alaska	1968	277000	3320.9	175.5	10.5	21.7	52.7	90.6	3145.5
5	Alaska	1969	282000	3880.1	221.3	10.6	29.4	67.4	113.8	3658.9
6	Alaska	1970	302173	3801.8	278.0	12.2	26.1	71.8	167.8	3523.8
7	Alaska	1971	313000	4164.5	355.3	13.4	43.5	67.1	231.3	3809.3
8	Alaska	1972	325000	4478.5	370.5	9.5	41.8	66.5	252.6	4108.0
9	Alaska	1973	330000	4943.3	384.5	10.0	44.5	67.0	263.0	4558.8
10	Alaska	1974	337000	5239.8	453.1	13.6	49.3	88.4	301.8	4786.6
11	Alaska	1975	352000	6196.6	539.8	12.2	44.6	129.5	353.4	5656.8
12	Alaska	1976	382000	6220.7	540.1	11.3	46.9	124.9	357.1	5680.6
13	Alaska	1977	407000	5898.0	443.2	10.8	51.6	96.8	284.0	5454.8
14	Alaska	1978	403000	6046.2	441.9	12.9	55.6	91.3	282.1	5604.2
15	Alaska	1979	406000	6203.7	491.1	13.3	71.9	109.6	296.3	5712.6
16	Alaska	1980	440142	5645.7	436.0	8.9	56.8	81.8	288.5	5209.7
17	Alaska	1981	412000	6594.9	615.8	14.6	102.2	114.6	384.5	5979.1
18	Alaska	1982	438000	6212.6	623.7	18.5	85.4	133.8	386.1	5588.8
19	Alaska	1983	479000	6018.6	613.8	13.8	101.5	97.1	401.5	5404.8
20	Alaska	1984	500000	6115.2	621.6	11.6	91.6	109.4	409.0	5493.6
21	Alaska	1985	521000	5877.0	581.8	9.8	77.2	92.9	401.9	5295.2
22	Alaska	1986	534000	6245.9	570.4	8.6	72.7	88.0	401.1	5675.5
23	Alaska	1987	525000	5377.5	455.4	10.1	65.0	73.1	307.2	4922.1
24	Alaska	1988	513000	4921.6	522.8	5.7	57.7	72.9	386.5	4398.8
25	Alaska	1989	527000	4779.9	497.7	8.0	52.9	67.6	369.3	4282.2
26	Alaska	1990	550043	5152.7	524.5	7.5	72.9	76.7	367.4	4628.2

Dynamic Barcharts



Dynamic Profile Plots

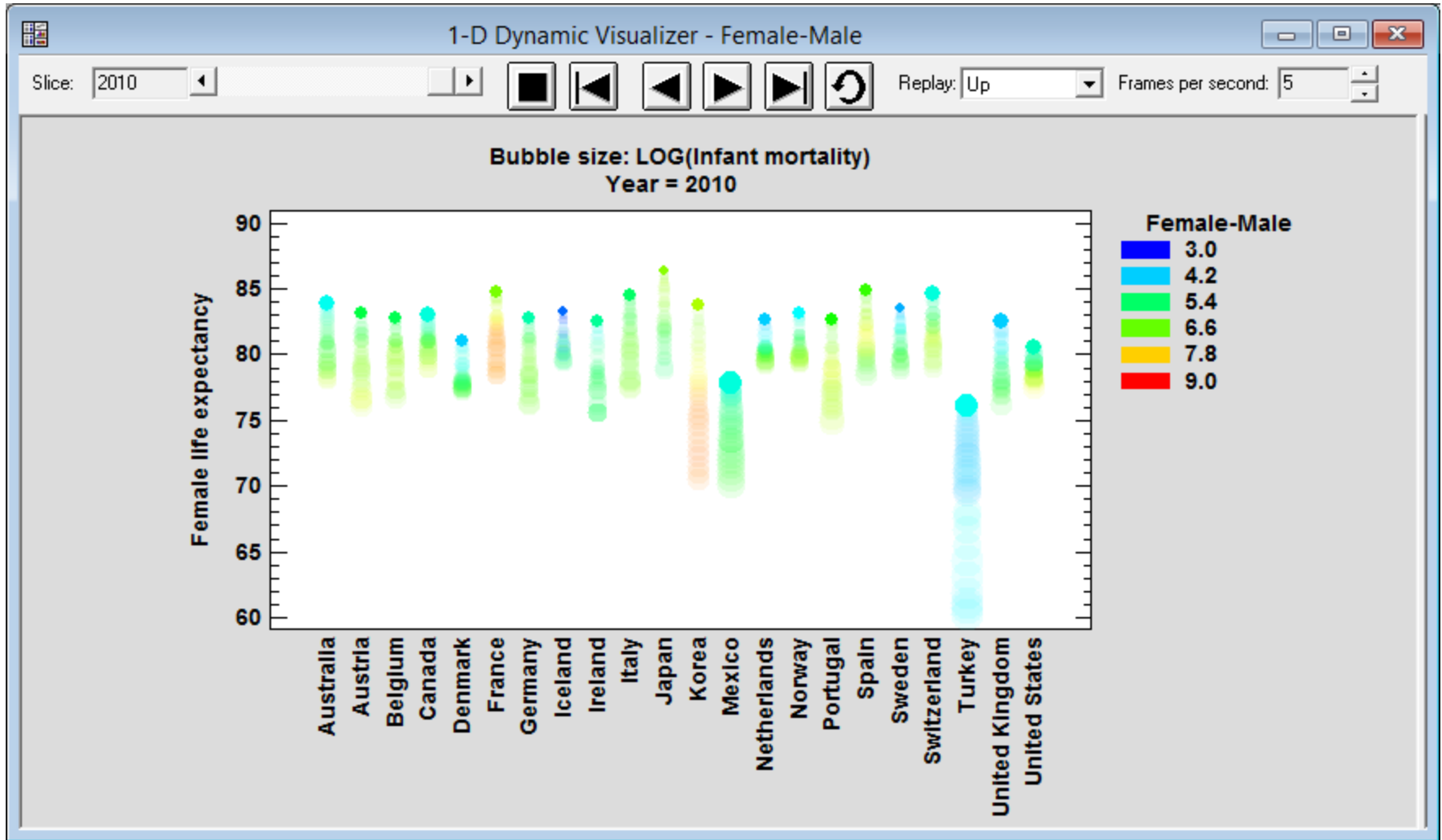


Multivariate Visualization over Time

Statistics for 22 OECD countries between 1980 and 2010

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	Country Code	Country	Region	Year	Population	Pop. Density	Rural Population	Female Percentage	Age Dependency Ratio	Life Expectancy (Total)	Life Expectancy (Female)
					total	people per sq. km of land area	% of total population	% of total population	% of working-age population	years at birth	years at birth
1	ABW	Aruba	LATIN AMER. & C	1961	55436	307.98	49.22	50.97	85.56	65.99	67.63
2	ABW	Aruba	LATIN AMER. & C	1962	56227	312.37	49.24	50.97	84.44	66.37	68.07
3	ABW	Aruba	LATIN AMER. & C	1963	56698	314.99	49.26	50.99	83.02	66.71	68.46
4	ABW	Aruba	LATIN AMER. & C	1964	57031	316.84	49.28	51.01	81.42	67.04	68.82
5	ABW	Aruba	LATIN AMER. & C	1965	57362	318.68	49.3	51.03	79.76	67.37	69.17
6	ABW	Aruba	LATIN AMER. & C	1966	57714	320.63	49.32	51.04	78.03	67.7	69.53
7	ABW	Aruba	LATIN AMER. & C	1967	58052	322.51	49.34	51.04	76.26	68.03	69.92
8	ABW	Aruba	LATIN AMER. & C	1968	58388	324.38	49.36	51.05	74.4	68.38	70.35
9	ABW	Aruba	LATIN AMER. & C	1969	58725	326.25	49.38	51.07	72.47	68.73	70.81
10	ABW	Aruba	LATIN AMER. & C	1970	59066	328.14	49.4	51.1	70.44	69.09	71.31
11	ABW	Aruba	LATIN AMER. & C	1971	59439	330.22	49.42	51.15	68.34	69.45	71.82
12	ABW	Aruba	LATIN AMER. & C	1972	59849	332.49	49.44	51.21	66.21	69.8	72.31
13	ABW	Aruba	LATIN AMER. & C	1973	60238	334.66	49.46	51.27	64.1	70.14	72.78
14	ABW	Aruba	LATIN AMER. & C	1974	60524	336.24	49.48	51.32	61.95	70.47	73.2
15	ABW	Aruba	LATIN AMER. & C	1975	60654	336.97	49.5	51.36	59.82	70.78	73.58
16	ABW	Aruba	LATIN AMER. & C	1976	60589	336.61	49.5	51.36	57.67	71.08	73.9
17	ABW	Aruba	LATIN AMER. & C	1977	60366	335.37	49.5	51.34	55.53	71.38	74.18
18	ABW	Aruba	LATIN AMER. & C	1978	60108	333.93	49.5	51.31	53.47	71.67	74.43
19	ABW	Aruba	LATIN AMER. & C	1979	59980	333.22	49.5	51.27	51.63	71.95	74.65
20	ABW	Aruba	LATIN AMER. & C	1980	60099	333.88	49.5	51.26	50.08	72.22	74.84

1-D Visualizer

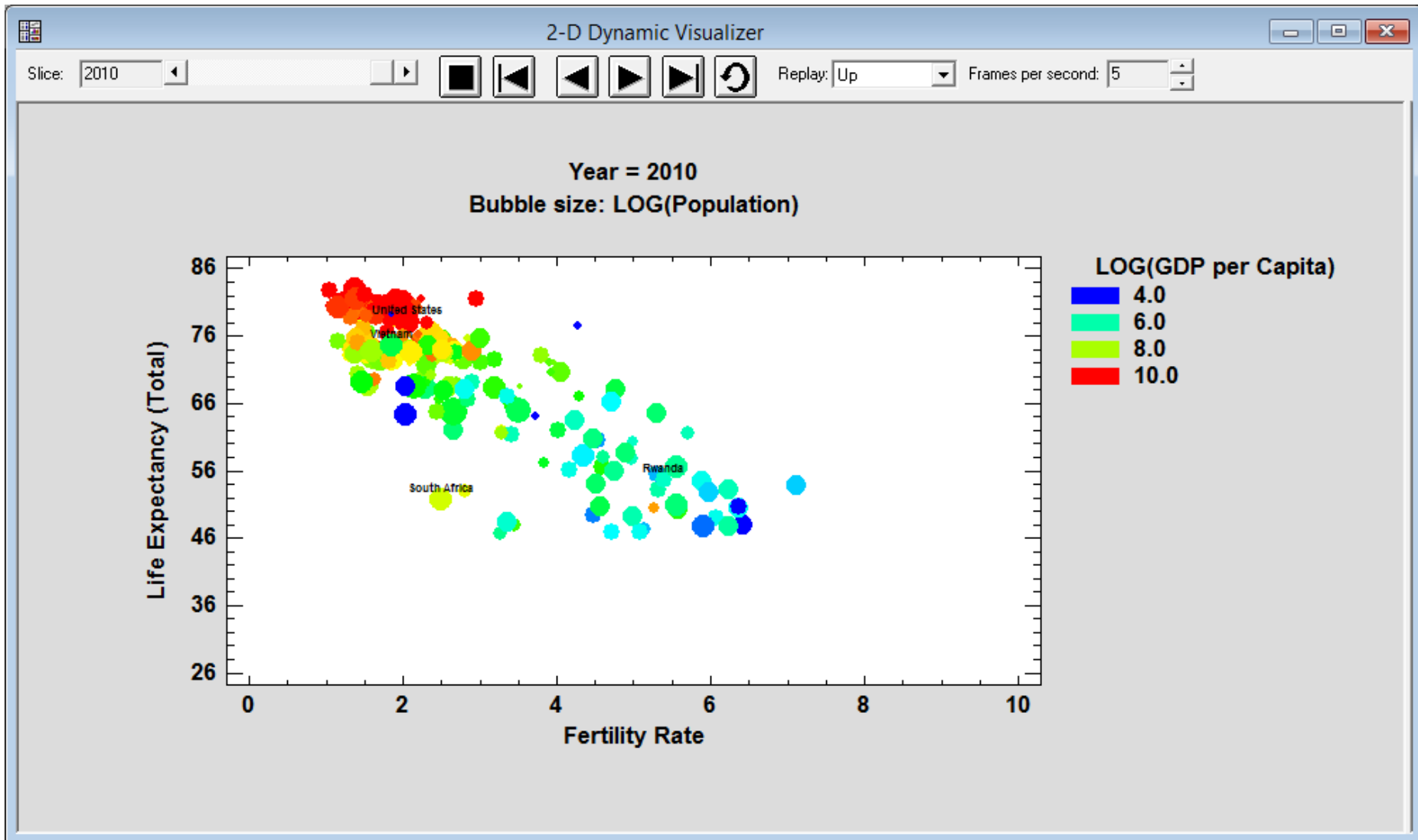


Multivariate Visualization over Time

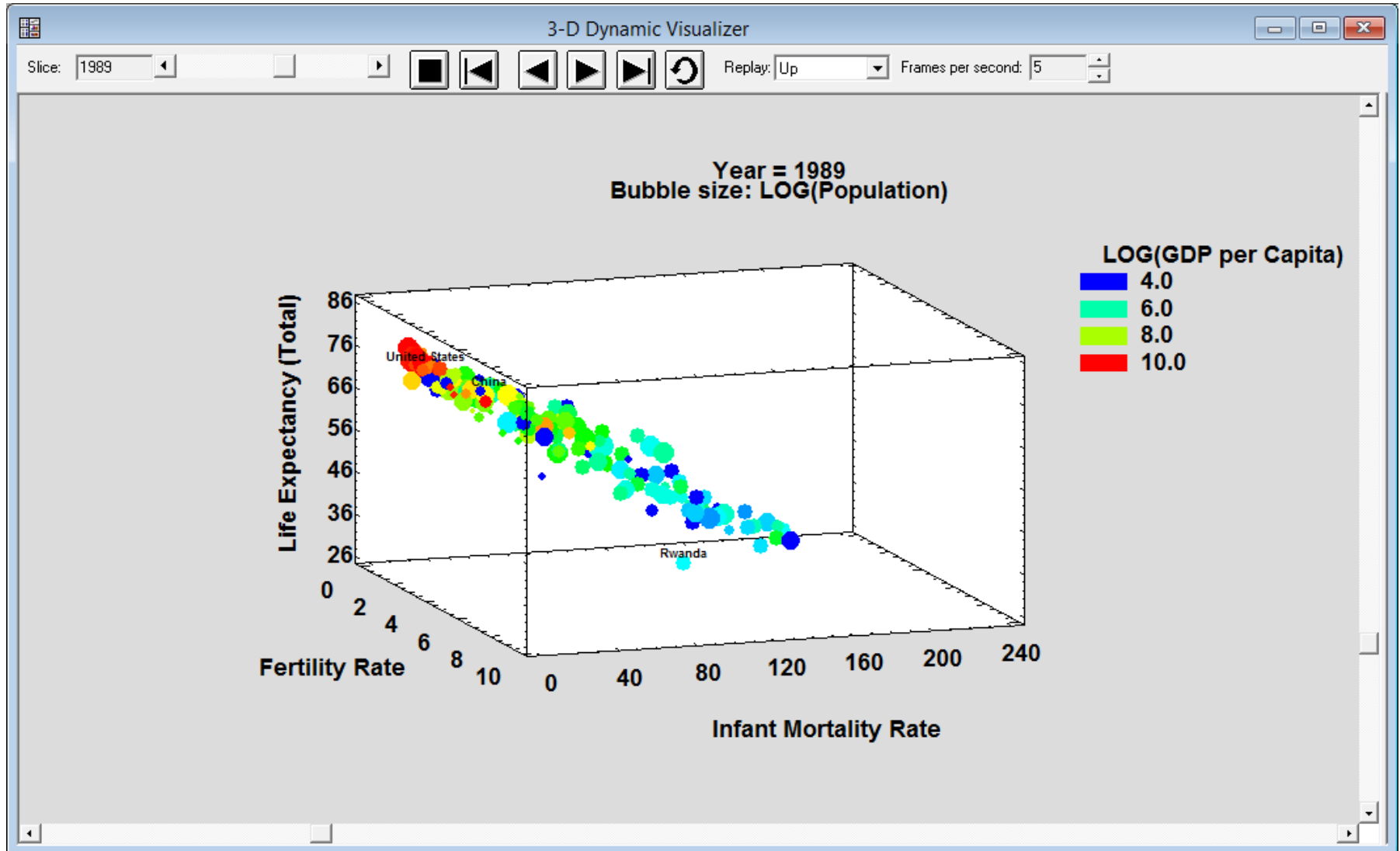
Demographics for 188 countries between 1961 and 2010

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	Country Code	Country	Region	Year	Population	Pop. Density	Rural Population	Female Percentage	Age Dependency Ratio	Life Expectancy (Total)	Life Expectancy (Female)
					total	people per sq. km of land area	% of total population	% of total population	% of working-age population	years at birth	years at birth
1	ABW	Aruba	LATIN AMER. & C	1961	55436	307.98	49.22	50.97	85.56	65.99	67.63
2	ABW	Aruba	LATIN AMER. & C	1962	56227	312.37	49.24	50.97	84.44	66.37	68.07
3	ABW	Aruba	LATIN AMER. & C	1963	56698	314.99	49.26	50.99	83.02	66.71	68.46
4	ABW	Aruba	LATIN AMER. & C	1964	57031	316.84	49.28	51.01	81.42	67.04	68.82
5	ABW	Aruba	LATIN AMER. & C	1965	57362	318.68	49.3	51.03	79.76	67.37	69.17
6	ABW	Aruba	LATIN AMER. & C	1966	57714	320.63	49.32	51.04	78.03	67.7	69.53
7	ABW	Aruba	LATIN AMER. & C	1967	58052	322.51	49.34	51.04	76.26	68.03	69.92
8	ABW	Aruba	LATIN AMER. & C	1968	58388	324.38	49.36	51.05	74.4	68.38	70.35
9	ABW	Aruba	LATIN AMER. & C	1969	58725	326.25	49.38	51.07	72.47	68.73	70.81
10	ABW	Aruba	LATIN AMER. & C	1970	59066	328.14	49.4	51.1	70.44	69.09	71.31
11	ABW	Aruba	LATIN AMER. & C	1971	59439	330.22	49.42	51.15	68.34	69.45	71.82
12	ABW	Aruba	LATIN AMER. & C	1972	59849	332.49	49.44	51.21	66.21	69.8	72.31
13	ABW	Aruba	LATIN AMER. & C	1973	60238	334.66	49.46	51.27	64.1	70.14	72.78
14	ABW	Aruba	LATIN AMER. & C	1974	60524	336.24	49.48	51.32	61.95	70.47	73.2
15	ABW	Aruba	LATIN AMER. & C	1975	60654	336.97	49.5	51.36	59.82	70.78	73.58
16	ABW	Aruba	LATIN AMER. & C	1976	60589	336.61	49.5	51.36	57.67	71.08	73.9
17	ABW	Aruba	LATIN AMER. & C	1977	60366	335.37	49.5	51.34	55.53	71.38	74.18
18	ABW	Aruba	LATIN AMER. & C	1978	60108	333.93	49.5	51.31	53.47	71.67	74.43
19	ABW	Aruba	LATIN AMER. & C	1979	59980	333.22	49.5	51.27	51.63	71.95	74.65
20	ABW	Aruba	LATIN AMER. & C	1980	60099	333.88	49.5	51.26	50.08	72.22	74.84

2-D Visualizer



3-D Visualizer



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