Other Regression Models

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Multiple Linear Regression

- Use to predict the value of the response variable as function of k predictor variables $x_1, \ldots, x_n$.

$$\hat{Y}_i = b_0 + b_1 X_{1i} + b_2 X_{2i} + \ldots + b_x X_{ki}$$

- Similar to simple linear regression.
- MS Excel can be used to do multiple linear regression.

CPU Time (yi)	I/O Time (x1i)	Memory Requirement (x2i)
2	14	70
5	16	75
7	27	144
9	42	190
10	39	210
13	50	235
20	83	400

Want do find:

$$CPUTime = b_0 + b_1 * I/OTime + b_2 * MemoryRequirement$$

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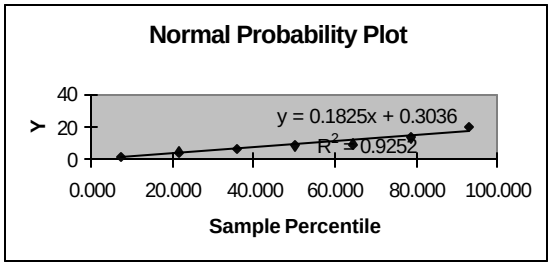
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9870
R Square	0.9742
Adjusted R Square	0.9614
Standard Error	1.1511
Observations	7

R

	Coefficients	*Standard Error*	*t Stat*	*Lower 95%*	*Upper 95%*	*Lower 90.0%*	*Upper 90.0%*
Intercept (b0)	-0.16145	0.91345	-0.17674	-2.69759	2.37470	-2.10878	1.78589
X Variable 1 (b1)	0.11824	0.19260	0.61389	-0.41652	0.65299	-0.29236	0.52884
X Variable 2 (b2)	0.02650	0.04045	0.65519	-0.08580	0.13881	-0.05973	0.11273



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Curvilinear Regression

- Approach: plot a scatter plot. If it does not look linear, try non-linear models:

Non-linear	Linear
$y = a + b/x$	$y = a + b(1/x)$
$y = 1/(a + bx)$	$(1/y) = a + bx$
$y = x/(a + bx)$	$(x/y) = a + bx$
$y = a \times b^x$	$\ln y = \ln a + x \ln b$
$y = a + bx^n$	$y = a + b(x^n)$

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