

MORE ON BASIS FUNCTIONS & THE MODEL

SINGLE VARIABLE (x) GLOBAL FUNCTIONS (WHOLE SPACE) LOCAL FUNCTIONS (CONFINED TO REGIONS)	{	$\phi_j(x) = x^j$	POWERS (POLYNOMIALS)
		$\phi_j(x) = T_j(x)$	ORTHOGONAL POLYNOMIALS
		$\phi_j(x) = \sin 2\pi f_j x$	TRIGONOMETRIC POLYNOMIALS
		$\phi_j(x) = \exp\left\{-\frac{(x-\mu_j)^2}{2s^2}\right\}$	"GAUSSIAN"
		$\phi_j(x) = \sigma\left(\frac{x-\mu_j}{s}\right)$	$\sigma(z) = \frac{1}{1+\exp(-z)}$

ETC.

MULTI VARIABLE
(x_1, x_2, \dots, x_D)

$\phi_j(\underline{x}) = x_j$ LINEAR (HYPERPLANE)

$\phi_j(\underline{x}) = x_1^{\alpha_1} x_2^{\alpha_2} \dots x_D^{\alpha_D}$ MULTIVARIABLE POLYNOMIALS

ALL
MODELS
LINEAR-IN-PARAMETERS

(EG. $\underline{x} = (x_1, x_2)$)

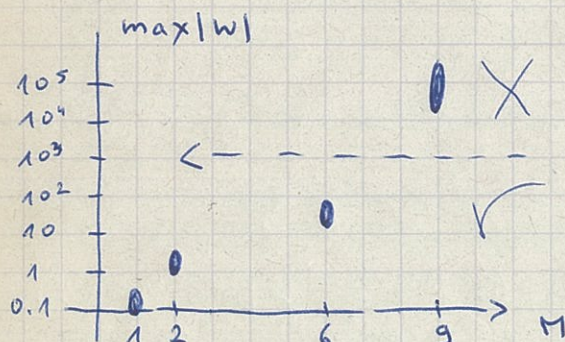
$$t = w_0 + w_1 x_1 + w_2 x_2 + w_3 x_1^2 + w_4 x_2^2 + w_5 x_1 x_2 + w_6 x_1 x_2^2 + \dots$$

(CURSE OF THE DIMENSION!)

OVERFITTING - THE WAY OUT → NEW OPTIMUM CRITERION

OBSERVATIONS: WHEN OVERFITTED — COMPLEX MODEL

— OVERLY LARGE WEIGHT VALUES (BISHOP)



(BISHOP P. 1.1)

↑
PENALTY!