WHERE $\phi(\underline{x}) = (x_1^2, \sqrt{2}x_1x_2, x_2^2)^T$ FEATURE SPACE

IF $k_1(\underline{x},\underline{x}')$ KERNEL, THEN $ck_1(\underline{x},\underline{x}')$

$k_2(\underline{x},\underline{x}')$ $f(\underline{x})k_1(\underline{x},\underline{x}')f(\underline{x}')$

$\exp(k_1(\underline{x},\underline{x}'))$

$k_1(\underline{x},\underline{x}')k_2(\underline{x},\underline{x}')$

$\cdots$

ETC. ($\boxed{\text{PAGE 296}}$) !

$\mathrm{DIM}(\underline{x}) \longleftrightarrow \mathrm{DIM}(\phi(\underline{x}))$

$k(\|\underline{x}-\underline{x}'\|) = \phi^T(\underline{x})\phi(\underline{x}')$

(RADIAL BASIS FUNCTIONS) └ ∞-DIM FEATURE SPACE

$k(\underline{x},\underline{x}') = \exp(-\|\underline{x}-\underline{x}'\|^2/2\sigma^2)$

$$k(\underline{x},\underline{x}') = (\underline{x}^T\underline{x}'+c)^2 \rightarrow \phi(\underline{x}) = (\sqrt{c}, \sqrt{2c}x_1, \sqrt{2c}x_2, \sqrt{2}x_1x_2, x_1^2, x_2^2)$$

$$= (\underline{x}^T\underline{x}'+c)^M \rightarrow \phi(\underline{x}) = \cdots$$

ALL TERMS UP TO DEG M

RADIAL BASIS FUNCTION NETWORKS (CH. 6.3)

$\phi_j(\underline{x}) = h(\|\underline{x}-\underline{\mu}_j\|)$

$\{\underline{x}_n, t_n\}$ $\quad y(\underline{x},\underline{w}) = f(\underline{x}) = \sum_{n=1}^{N} w_n h(\|\underline{x}-\underline{x}_n\|)$

└ LS OPTIMUM

NOISE ON $\underline{x}$: $\nu(\underline{\xi})$

$$E = \frac{1}{2}\sum_{n=1}^{N}\int\{y(\underline{x}_n+\underline{\xi})-t_n\}^2\nu(\underline{\xi})\,d\underline{\xi}$$

$$\downarrow$$

$$y(\underline{x}_n) = \sum_{n=1}^{N} t_n h(\underline{x}-\underline{x}_n)$$

$$\downarrow$$

$$\frac{\nu(\underline{x}-\underline{x}_n)}{\sum_{n=1}^{N}\nu(\underline{x}-\underline{x}_n)}$$

$\sum_n h(\underline{x}-\underline{x}_n) = 1$

NORMALIZATION

(FIG. 6.3)