Model Matching

Given:

- a function $y^*(x, \mathbf{p})$ of the argument x and set of model parameters $\mathbf{p} = \{p_m\}_{m=1..M} = \{p_1, p_2, \dots p_M\}$
- a discrete finite training dataset: $\{(x_k, y_k)\}_{k=1..N} = \{(x_0, y_0), (x_1, y_1), \dots, (x_N, y_N)\}$ representing the available knowledge about the system the model is trying to describe

then matching procedure assumes searching for the specific set of model parameters $\mathbf{p}_{\text{bestfit}}$ to minimize the goal function:

$$G(\mathbf{p}) = \sum_{k=1}^{N} \Psi\left(y^*(x_k) - y_k\right) \to \min \iff \mathbf{p} = \mathbf{p}_{\text{bestfit}}$$

where $\Psi(z)$ is the discrepancy distance function.

The most popular choices are $\Psi(z) = z^2$ and $\Psi(z) = |z|$.

See also

Human / Science / Formal Science / System Science / System Model