International Journal for ENGINEERING MODELLING
Vol. 10, No. 1-4, 1997.

A non-parametric approach to empirical modelling of engineering problems

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SUMMARY

A non-parametric multidimensional regression, called CAE (Conditional Average Estimator), is described. It can be applied for solving some problems in engineering which rely on empirical information. The method is able to automatically describe the phenomena. The main features which distinguish the method from standard regression procedures are: (1) the relationship between the input and output variables is not selected a priori by a prediction law; (2) an arbitrary number of input variables can be taken into account, provided that an appropriate data base exists; (3) the computational procedure is very simple. The results can be easily updated when new information becomes available. Two application examples from the field of earthquake engineering are presented in the paper: (a) the prediction of the seismic capacity of RC structural walls, and (b) the prediction of the peak ground acceleration at a specific site.