Analysis of Dynamic Systems Using Heuristic Optimization¹

F. FREUDENSTEIN.² The authors have made a valuable contribution to the optimization of mechanical systems. An efficient algorithm based on heuristics has been developed and applied with success to the solution of a difficult problem (the inverse dynamic problem).

The technique is general and can be applied to the optimization of practically any mechanical system within the capacity of the program. Since it does not depend on an initial solution, continuity in the derivatives or approximate linearity, it is particularly effective in problems for which more conventional methods fail. The combination of the HOT algorithm with the "Automatic Assembly Program - Displacement Analysis" has reduced the task of applying heuristic optimization to a practical technique within the reach of the mechanical engineering profession.

The authors deserve credit for the development of a powerful tool in the optimization of mechanical systems.

Authors' Closure

The authors would like to thank Professor Freudenstein for his thoughtful comments and complimentary discussions of our paper.

Indeed it is true that the use of this technique does not depend on an initial solution or any behavior criterion such as continuity. For highly nonlinear problems encountered in mechanical design, especially in the mechanisms field, it is usually the nonlinearity rather than the number of variables involved, which is responsible for the failure of the conventional optimization methods. The generation of initial estimates represents a major difficulty. The true value of this algorithm lies in obtaining optimum solution to problems of this kind.

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