

Optimum Blank Design for Deep Drawing Using Interaction of High and Low Fidelity Simulation

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This paper deals with the optimization of blank design for deep drawing processes. The developed design optimization system utilises the interaction of high- and low-fidelity finite element simulations of a deep drawing process, and the multipoint approximation technique based on the iterative response surface building. Approximation functions and a weighting scheme are introduced in order to correct the low-fidelity responses so they can be treated as high quality approximations. The approximated problem is then solved by the multipoint approximation technique, hence there are two levels of approximation in the optimization process. The system has been applied to the optimum blank design for deep drawing process of a rectangular box. The optimization problem is to determine the optimum initial blank design that minimizes the waste of material. The required computational effort was considerably reduced as compared to the use of high-fidelity simulations only without compromising on the quality of the solution.

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