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Simultaneous Optimization of Initial Blank Shape and Blank Holder Force Trajectory for Square Cup Deep Drawing Using Sequential Approximate Optimization

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Abstract

Optimal blank shape minimizing earing in deep drawing has a direct influence on material saving as well as product quality. This paper proposes a method for determining the optimal blank shape design in square cup deep drawing using sequential approximate optimization (SAO) with a radial basis function (RBF) network. The earing is minimized under tearing and wrinkling constraints with a variable blank holder force (VBHF), which varies through the punch stroke. Through numerical and experimental results, the validity of the proposed approach is examined.

Keywords: deep drawing blank shape design; variable blank holder force; sequential approximate optimization.