Optimum 2-dimensional filter design via SIP with frequency domain approximation

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Abstract:

In this paper, a two-dimensional filter design problem is considered. It formulated as a semi-infinite programming problem, where the objective is to minimize the ripple energy of the filter subject to the passband and stopband specifications in the frequency domain of the filter. An improved dual parameterization method is applied to solve this semi-infinite programming problem. In order to reduce the computational effort, the passband and stopband regions were approximated from outside by a combination of triangles, and the approximate problem is reformulated by 'folding' these triangular regions. It is shown that the optimal solution of the approximate problem. Our simulation results, compared with those obtained by the single value decomposition approach, show further passband and stopband and stopband ripple reductions of, respectively, 26.6250% and 47.9527%.