

Spectral optimization of electrical circuits

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We consider a stabilization problem which arises in the design of wide-band operational amplifiers. The aim is to assign the eigenvalues of the underlying differential-algebraic system in a certain sector of the complex plane by introducing only new capacitors in the circuit. Determining such a configuration of capacitors with minimal overall capacity leads to a high-dimensional non-convex optimization problem. In this talk, it is shown how approximate solution of this optimization problem can be obtained efficiently. Our method is based on reformulation of the problem as a rank-one eigenvalue assignment problem for matrix pencils whose solution can then be used to determine a suitable capacitor. The method is then applied to the OpAmp $\mu A741$. The results are based on a joint work with Dominik Krauß, Ralf Sommer (TU Ilmenau, Insitut für Mikroelektronik- und Mechatronik-Systeme) and Carsten Trunk (TU Ilmenau).

References

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