Low rank perturbation of Kronecker structure

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Resumen

Let $\mathcal{L}(\lambda)$ be a $m \times n$ singular matrix pencil. When we perturb $\mathcal{L}(\lambda)$ additively by another singular matrix pencil, $\mathcal{M}(\lambda)$, satisfying $\text{rank}(\mathcal{L}) + \text{rank}(\mathcal{M}) < min\{m, n\}$, the perturbed pencil $\mathcal{L} + \mathcal{M}$ remains singular. In this talk, we describe the generic change of the Kronecker structure from $\mathcal{L}$ to $\mathcal{L} + \mathcal{M}$. We will assume that the Kronecker structure of $\mathcal{L}$ is known, whereas only partial information about the structure of $\mathcal{M}$ is needed. We also give sufficient conditions under which the mentioned generic change on the Kronecker structure holds. This work, contained in [1], is related with a previous one by the authors concerning the change of the Weierstrass structure of a regular matrix pencil under low rank perturbations, [2]. However, the generic behavior we find for the singular case has nothing to do with the behavior for regular matrix pencils. Besides, the singular case requires very different mathematical techniques.

Sección en el CEDYA 2007: Álgebra lineal numérica

Referencias

[1] F. de Terán and F. M. Dopico *Low rank perturbation of Kronecker structures without full rank*, To appear in SIAM J. Matrix Anal. Appl.

[2] F. de Terán, F. M. Dopico and J. Moro, *Low rank perturbation of Weierstrass structure*, submitted, 2005.