Povzetek

Psevdospekter je neke vrste razširitev spektra, saj ga lahko definiramo s pomočjo spektra zmotenih matrik, hkrati pa je spekter tudi podmnožica psevdospektra. Standardno orodje za analizo matrik so bile skozi zgodovino lastne vrednosti, ki so uporabne za napoved obnašanja sistemov, ki jih matrike opisujejo. Še en razlog njihove uporabnosti pa je psihološki in sicer lahko lastne vrednosti narišemo v kompleksni ravnini ter si tako lažje predstavljamo, kje obravnavana matrika "živi" in kakšne so njene lastnosti.

Tudi psevdospekter lahko pove veliko o matriki. Predstavljen je njegov zgodovinski razvoj ter s tem povezane štiri definicije, ki se izkažejo za ekvivalentne. Opisani so algoritmi, kako ga lahko izračunamo oziroma narišemo, na koncu pa je predstavljenih še nekaj primerov uporabe, od določanja razdalje do singularnosti matrike, pa do uporabe v biologiji in ekologiji pri spremljanju razvoja posameznih živalskih vrst.

Abstract

Pseudospectra is a kind of generalization of the spectrum, because we can define it by the spectrum of perturbed matrices, and at the same time the spectrum is a subset of the pseudospectra. A standard tool for matrix analysis through history were eigenvalues, which are useful for predictions about system behaviour, which is described by matrices. Another reason for their usefulness is a psychological one - the eigenvalues can be drawn in a complex plane, so it is easier to see where the matrix "lives" and what characteristics it has.

The pseudospectra can tell us a lot about the matrix too. Historical development of the pseudospectra is described, as well as its four definitions, which turn out to be equivalent. Furthermore algorithms, which describe how the pseudospectra can be computed or drawn, are presented. At the end a few examples of its use are shown, from the determination of distance and singularity of a matrix to applications in biology and ecology, where evolution and growth of different species can be observed.

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