

Computing the joint spectral radius of a family of matrices

Nicola Guglielmi
University of L'Aquila, Italy

This is a joint work with Marino Zennaro (Trieste).

The extension of the spectral radius from a single matrix to a family of matrices is called joint spectral radius and has been studied extensively in the last few years. The problem of its computation occurs in many fields, like in the construction of compactly supported wavelets, in the robustness analysis of control systems, in the analysis of the capacity of codes with forbidden patterns and - for example - in consensus algorithms.

Furthermore, when studying stability properties of numerical methods for differential equations we are often lead to the problem of the asymptotic stability analysis of linear non-autonomous difference equations following a worst-case point of view. For this the joint spectral radius yields the natural extension for a discrete system of the Ljapunov exponent for a continuous system.

It is known that the joint spectral radius is an object that is hard to compute and that has many interesting features. One of these is related to the so-called finiteness property. We consider here the associated computational problem by means - as main instrument - of the so-called balanced complex polytope norms.

We illustrate the technique by suitable examples.