

Seminário de sistemas dinâmicos e estocásticos

Departamento de Matemática - IMECC - UNICAMP

A uniform bound from below of the angle between the fast and slow spaces for two-sided sequences of bounded operators in a Banach space.

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Resumo:

We consider a two-sided sequence of bounded operators in a Banach space which are not necessarily injective and satisfy the following two properties (SVG) and (FI). The singular value gap (SVG) property says that two successive singular values of the cocycle at some index d admit a uniform exponential gap, the fast invertibility (FI) property says that the cocycle is uniformly invertible on the fastest-growing d -dimensional direction. We prove the existence of a uniform equivariant splitting of the Banach space into a fast space of dimension d and a slow space of codimension d . We compute an explicit constant of the bound from below of the angle between these two spaces using solely the constants defining the properties (SVG) and (FI). We extend the results obtained by Bochi-Gourmelon in finite-dimension for bijective operators and the results obtained by Blumenthal-Morris in infinite-dimension for injective norm-continuous cocycles, in the direction that no dynamical system is involved, no compactness of the underlying system, no smoothness of the cocycle is required. Moreover we give quantitative estimates of the angle between the fast and slow spaces that are also new in finite dimension for bijective operators. Moreover, one of the main aspects of our work is that rather than relying on compactness to give the existence of a lower bound, we give concrete estimates of the angle between the fast and slow spaces in terms of dynamically-relevant quantities. These bounds are new even in the case of finite-dimensional invertible operators.

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