

Bifurcation for Hadamard-differentiable problems

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Abstract

We consider the equation $F(\lambda, u) = 0$ for a mapping $F : \mathbb{R} \times X \rightarrow Y$ between Banach spaces X and Y with $F(\lambda, 0) \equiv 0$ under the assumption that $F(\lambda, \cdot) : X \rightarrow Y$ is Hadamard differentiable at 0, but not necessarily Fréchet differentiable. For points λ_0 at which $D_u F(\lambda, 0) : X \rightarrow Y$ is a Fredholm operator of index zero, we seek conditions determining whether or not λ_0 is a bifurcation point. Unlike earlier work in this direction, the present approach does not require any compactness assumptions about F . Applications to second order elliptic equations on \mathbb{R}^N will be summarized.