Numerical methods for bifurcations of dynamical equilibria

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Abstrak

Dynamical systems arise in all fields of applied mathematics. The author focuses on the description of numerical methods for the detection, computation, and continuation of equilibria and bifurcation points of equilibria of dynamical systems. This subfield has the particular attraction of having links with the geometric theory of differential equations, numerical analysis, and linear algebra.
Several features make this book unique. The first is the systematic use of bordered matrix methods in the numerical computation and continuation of various bifurcations. The second is a detailed treatment of bialternate matrix products and their Jordan structure. Govaerts discusses their use in the numerical methods for Hopf and related bifurcations. A third feature is a unified treatment of singularity theory, with and without a distinguished bifurcation parameter, from a numerical point of view. Finally, numerical methods for symmetry-breaking bifurcations are discussed in detail, up to the fundamental cases covered by the equivariant branching lemma.