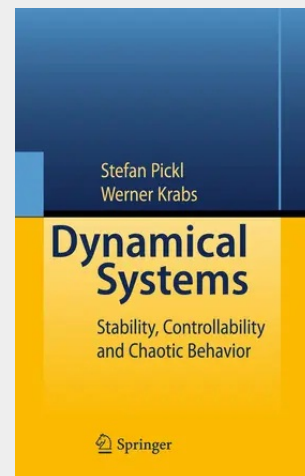


Dynamical Systems

Stability, Controllability and Chaotic Behavior

At the end of the nineteenth century Lyapunov and Poincaré developed the so called qualitative theory of differential equations and introduced geometric- topological considerations which have led to the concept of dynamical systems. In its present abstract form this concept goes back to G.D. Birkhoff. This is also the starting point of Chapter 1 of this book in which uncontrolled and controlled time-continuous and time-discrete systems are investigated. Controlled dynamical systems could be considered as dynamical systems in the strong sense, if the controls were incorporated into the state space. We, however, adapt the conventional treatment of controlled systems as in control theory. We are mainly interested in the question of controllability of dynamical systems into equilibrium states. In the non-autonomous time-discrete case we also consider the problem of stabilization. We conclude with chaotic behavior of autonomous time discrete systems and actual real-world applications.

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