Perturbation Problems in Economics and Physics

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Often a macroeconomic system of a nation is formulated in economics as a dynamical system. The perturbation problem emerges when we consider the interaction of two or more national economies, in particular, those of similar but not necessarily identical structures. The author successfully analyzed the saddle stability of international economies that are interrelated by trade and capital movements, by utilizing the Rouché's theorem in the analysis of complex variables. We (Cheng, Hamada, and Kamihigashi) shed light on the determinant of international capital movements when the rates of time preference differ among nations or individuals. Similarly, we can clarify the dynamics of capital movements and trade in a world where the rates of time preference and people live for a finite period.

Herman Haken (Advanced Synergies) presents many cases where the perturbation phenomenon and its analytical treatment help the understanding of social organizations. In this paper, we introduce the reader out application of perturbation methods to economic dynamics, and then explore further issues and areas in social science where the method of perturbation may be productively applied.