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Onna, Okinawa 904-0495, Japan

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Editorial Office,
Nonlinear Dynamics,
Springer Nature

Dear Editor,

Please find enclosed the manuscript titled, "Asymptotic Center–Manifold for the Navier–Stokes", that the author would like to submit as a research article to Nonlinear Dynamics.

Center-manifolds form one of the central objects of study for systems undergoing a bifurcation. The manuscript presents a novel method of obtaining a center-manifold approximation for the Navier–Stokes system that is perturbed away from the bifurcation point. The result is an asymptotic center-manifold approximation which formally incorporates parameter variations naturally. Subsequently, the general structure of the asymptotic solutions of the center-manifold is highlighted, culminating in the Stuart-Landau equation.

Application of the method to the classic problem of a Hopf bifurcation in a cylinder wake, and a more recent case of flow in an open cavity illustrates that the methodology captures dynamics close to the bifurcation point quite well.

The underlying methodology presented may infact be adapted to any dissipative system undergoing a bifurcation and the general structure of the asymptotic solutions remains the same. The author believes that the analysis and methodology presented will be of great interest to a broad spectrum of researchers, and hopes that the Editor finds the manuscript suitable for publication in Nonlinear Dynamics.

Best Regards

Prabal S. Negi