



Bifurcation analysis of wind-driven flows with MOM4

E. Bernsen and H.A. Dijkstra

Utrecht University, IMAU, Utrecht, Netherlands (e.bernsen@phys.uu.nl)

In this presentation, the methodology of bifurcation analysis is applied to the explicit time-stepping ocean model MOM4 using a Jacobian-Free Newton-Krylov (JFNK) approach. We in detail present the implementation of the JFNK method in MOM4 but restrict the preconditioning technique to the case for which the density distribution is prescribed. For a prescribed density field case, we present bifurcation diagrams, for the first time in MOM4, for the wind-driven ocean circulation. In addition, we show that the JFNK method can reduce the spin-up time to a steady equilibrium in MOM4 considerably.