Abstract Submitted
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Parallelizing Time Using Parareal As Implemented by the SWIM IPS[1] L.A. BERRY, ORNL, D. SAMADDAR, D.E. NEWMAN, U. of A. Fairbanks, R. SANCHEZ, ORNL, SWIM TEAM — A challenge for time-dependent simulations is to make effective use parallel computers–time cannot be directly parallelized. The Parareal algorithm [Lyons] does parallelize in time, and may run with a shorter wall-clock time at the expense of computer cycles. Parareal iteratively couples a coarse, fast serial solver with a fine, (much) slower solver that runs time slices in parallel. The algorithm specifies how to couple the two solvers and (always) converge to a solution. How efficiently it converges depends on the choice of the coarse solver. This workflow is implemented within the IPS framework to test the use of Parareal in speeding up drift wave simulations. The IPS resource manager is key to the implementation. Tests using the Lorenz system have been successful, and investigations for the drift wave code BETA. [Newman] are now underway [Samaddar]. [Newman] D.E. Newman, et al., Phys. Plasmas 1, 1592 (1994). [Lyons] J.L Lyons, et al., C. R. Acad. Sci. Paris 332, 661 (2001). [Samaddar] D. Samaddar, et al., Journal of Computational Physics 229, 6558 (2010).

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