1154-34-882 **James D Meiss*** (jdm@colorado.edu), Applied Mathematics, UCB 526, Boulder, CO 80309-0526, and **Rebecca A Mitchell**. *Optimizing Mixing in Aref's Blinking Vortex Flow.*

Mixing of a passive scalar in a fluid flow results from a two part process in which large gradients are first created by advection and then smoothed by diffusion. We will discuss methods of designing efficient stirrers to optimize the mixing of a passive scalar in a two-dimensional nonautonomous, incompressible flow over a finite time interval. The flow is modeled by a sequence of area-preserving maps whose parameters change in time, defining a mixing protocol. As an example, we study a version of Aref's blinking vortex flow; here the stirrers are modeled as point vortices. The positions and strengths of the vortices represent parameters to be selected to optimize the stirring efficiency. Stirring efficiency is measured in two ways: a version of a "mix-norm"—a negative Sobolev seminorm, and the "mix-variance" a smoothed variance. A Perron-Frobenius operator is used to numerically advect the scalar. Various strategies for obtaining near-optimal protocols are compared with those obtained by random optimization methods. (Received September 11, 2019)