Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Optimal transport in truncated models of Rayleigh-Bénard convection[1] ANDRE N. SOUZA, CHARLES R. DOERING, University of Michigan — We investigate absolute limits on heat transport in a truncated model of Rayleigh-Bénard convection. Two complementary analyses are used to derive upper bounds in an eight model: a background method analysis and an optimal control approach. In the optimal control formulation the flow no longer obeys an equation of motion, but is instead a control variable. The background method and the optimal control approach produce the same estimate. However, in contrast to a simpler system (i.e., the Lorenz equations) the optimizing flow field—which is observed to be time independent—does not correspond to an exact solution of the equations of motion.

[1]Supported by NSF Mathematical Physics award PHY-1205219 with an Alliances for Graduate Education and the Professoriate (AGEP) Graduate Research Supplement.

Andre N. Souza
University of Michigan

Date submitted: 01 Aug 2014 Electronic form version 1.4