1113-93-268 **Jose de Jesus Martinez*** (jesusmtz@iastate.edu), Department of Mathematics, Iowa State University, Carver Hall, Ames, IA 50010, and **Scott Hansen** (shansen@iastate.edu). *Modeling and controllability of a heat equation with singular density.* Preliminary report.

We consider a linear hybrid system consisting of two rods connected by a thin wall of width 2ϵ and density $1/2\epsilon$. By passing to a limit, we obtain a system describing heat flow of two rods connected by a "point mass" whose dynamics are governed by a differential equation. We show that the system is null controllable with either a Dirichlet or Neumann boundary control at one end. The results are based on spectral analysis together with the moment method. (Received August 24, 2015)