Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Mean-field behavior of the Burridge-Knopoff model with long-range interactions[1] JUNCHAO XIA, Clark University, HARVEY GOULD, Clark University, WILLIAM KLEIN, Boston University, JOHN RUNDLE, UC, Davis — The one-dimensional Burridge-Knopoff model with a variable-range Kac-like interaction is simulated using molecular dynamics, and the number of earthquake-like events is obtained. In agreement with Carlson and Langer (Phys. Rev. A 40, 6470 (1989)) the event size distribution is found to exhibit power law scaling for nearest-neighbor interactions over a limited range of event sizes. We find that long-range interactions yield mean-field exponents only if the parameter characterizing the ratio of the largest characteristic slipping speed to the speed at which the dynamical friction is appreciably reduced is sufficiently small. In this limit the dynamical behavior of the long-range Burridge-Knopoff model becomes similar to the cellular automaton model of Rundle, Jackson, and Brown and Olami, Feder, and Christensen.

[1]Supported in part by DOE

Junchao Xia
Clark University

Date submitted: 14 Dec 2004 Electronic form version 1.4