1057-74-338   **Anna Vainchtein*** (`aav4@pitt.edu`), Department of Mathematics, University of Pittsburgh, 301 Thackeray Hall, Pittsburgh, PA 15260. *Effect of nonlinearity on the steady motion of a twinning dislocation.* Preliminary report.

We consider a steady motion of a twinning dislocation in a Frenkel-Kontorova lattice with a double-well substrate potential that has a non-degenerate spinodal region. Semi-analytical traveling wave solutions are constructed for the piecewise quadratic potential, and their stability and further effects of nonlinearity are investigated numerically. We show that the width of the spinodal region and nonlinearity of the potential have a significant effect on the dislocation kinetics, resulting in stable steady motion in some low-velocity intervals and lower propagation stress. We also conjecture that a stable steady propagation must correspond to an increasing portion of the kinetic relation between the applied stress and dislocation velocity. (Received January 25, 2010)