1037-35-57 **Tetsu Mizumachi*** (mizumati@math.kyushu-u.ac.jp), Hakozaki 6-10-1, Higashi-ku, Fukuoka, 812-8581, Japan. *Asymptotic stability of lattice solitons in the energy space.*

We study asymptotic stability for 1-soliton solutions to the Toda lattice equations both in the energy space and in an exponential weighted space. We prove asymptotic stability of small solitary waves to the FPU lattice equations in the energy space as well.

First, we study exponential linear stability of linearized Toda lattice equations around 1-soliton solutions making use of a linearized Bäcklund transformation. Combining a linear stability result with a general theory of nonlinear stability by Friesecke and Pego for solitary waves of lattice equations, we conclude that all solitons in the Toda lattice are asymptotically stable in an exponentially weighted space.

To prove stability of 1-soliton solutions in the energy space, we split a solution around a 1-soliton into a small solution that moves more slowly than the main solitary wave, and an exponentially localized part, and use a virial inequality for the small solution and apply the exponential linear stability result to the localized part.

Unlike analogous Hamiltonian PDEs, the lattice equations do not conserve momentum. Furthermore, the Toda lattice equation is a bidirectional model that does not fit in with existing theory for Hamiltonian system by Grillakis, Shatah and Strauss. (Received January 17, 2008)