1035-60-676 **Peter Baxendale*** (baxendal@math.usc.edu), University of Southern California, Department of Mathematics, 3620 S Vermont Avenue, KAP 108, Los Angeles, CA 90089-2532. *Almost sure stability for a stochastic beam equation.*

The transverse vibrations of an Euler Bernoulli beam with axial tension P and axial white noise forcing are given by

$$my_{tt} + m\alpha y_t + EIy_{xxxx} - Py_{xx} = \sigma y_{xx}\dot{W}(t), \quad 0 < x < \ell.$$

With hinged endpoints $y(0,t) = y_{xx}(0,t) = y(\ell,t) = y_{xx}(\ell,t) = 0$ the solution may be written

$$y(x,t) = \sum_{n=1}^{\infty} \sin\left(\frac{n\pi x}{l}\right) c_n(t).$$

where the amplitude $c_n(t)$ of the nth mode of vibration is given by a two-dimensional linear stochastic (ordinary) differential equation. The main result is a formula for the almost sure Lyapunov exponent for the SPDE in terms of the almost sure Lyapunov exponents for each of the SDEs corresponding to modes which are present in the initial condition. The almost sure Lyapunov exponent for the SPDE depends sensitively on the initial distribution of energy amongst the infinitely many modes of vibration, and it cannot be well approximated using only finitely many modes of vibration. This is joint work with Marios Picas (Frederick Institute of Technology, Cyprus). (Received September 13, 2007)