

title	Experimental bifurcations
name	John Sharpe
phone	756 2069
email	jsharpe@calpoly.edu
additional	
department	Physics
proj_desc	<p>Bifurcations occur when a parameter of a differential equation is varied so that the qualitative behavior of the equation changes. Bifurcations are a central part of the study of dynamical systems. However, what is conspicuously lacking in the literature are descriptions of simple mechanical systems that can be used to obtain quantitative data about bifurcations. Part of the reason for this is the bifurcations tend to occur in a very small range about the critical value of the control parameter. In this project we will investigate an implementation of a buckling experiment that would be suitable for use in nonlinear dynamics classes both here and at other institutions. The plan is to use an Euler strut (which exhibits a supercritical pitchfork bifurcation) and measure the strut deflection opto-electronically. This would provide a real-time experiment which would be of interest to the national dynamical-systems education community.</p>
inter_desc	<p>Bifurcations are seen in many dynamical systems, from areas as diverse as magnetic phase transitions to the outbreak of epidemics of infectious diseases. This project seeks to draw together expertise in mathematics, physics and engineering to create an intuitively understandable experiment that yields quantitative data and would be used to help others understand the rich behavior that can occur in dynamical systems.</p>
links	http://www.calpoly.edu/~jsharpe/dsil_frontpage.htm
students	2
majors	PHYS, MATH, ME, EE
date_added	2007-11-15 16:41:36