Consortium for Ordinary Differential Equations Experiments

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In This Issue

The goal of the ODE Consortium, which is composed of faculty associated with each of the seven sponsoring institutions, is to distribute information on the design and use of interactive computer experiments in courses involving ODEs. The Consortium is funded by the NSF through the Division of Undergraduate Education and sponsors summer faculty workshops towards this goal. Many of the items in C•ODE•E are based upon work supported by the National Science Foundation under Grant No. DUE-9154300. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

C•ODE•E

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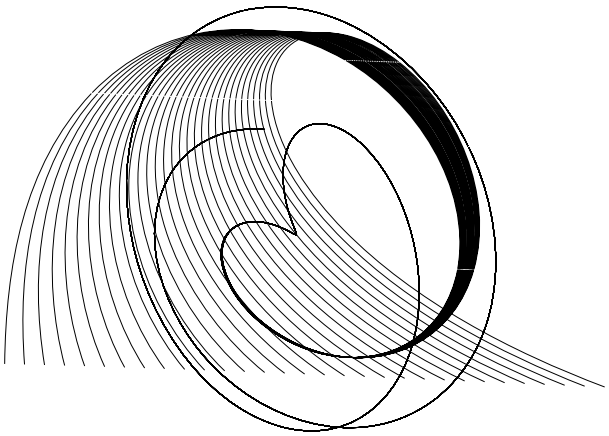
Solutions of Duffing's equation $x'' + 0.15x' + (x^3 - x) = 0.3\phi(t)$ with aperiodic forcing function $\phi(t) = [\cos t + \cos\sqrt{2}t]/2$. These solutions, starting at $t = 0$, lie on a surface which can be shown analytically to exist. The surface is unstable, so that slight errors in the initial conditions lead to trajectories that quickly fly away, above or below the surface. However, within the surface, trajectories tend to a singular solution of the equation, shown here computed out to $t = 20$. The horizontal and vertical axes are $u = x - x'$ and $v = x + x'$, respectively.



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