Applied Mathematics

CRM-McGill Applied Mathematics Seminar

Nov. 20, 2006, 2:35 pm Monday
At McGill, Burnside Hall 1205

" Bifurcations of global reinjection orbits near a saddle-node Hopf bifurcation"

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Coffee and refreshments will be served after the seminar

Abstract: The saddle-node Hopf bifurcation (SNH) can be found in numerous vector field models arising in applications. We consider here the case that there is a global reinjection mechanism, where the dynamics returns to a neighborhood of the bifurcation point after a global excursion. Such a SNH bifurcation with global reinjection occurs naturally in applications, most notably in models of semiconductor lasers.

We construct a three-dimensional model vector field that allows us to study the possible dynamics near a SNH bifurcation with global reinjection. We use numerical continuation techniques to find a two-parameter bifurcation diagram for a well known and complicated case of a SNH bifurcation that involves the break-up of an invariant sphere. The results are of relevance to laser dynamics, where an excursion may be associated with a pulse in the laser's output.