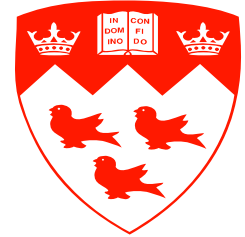


Applied Mathematics



McGill Applied Mathematics Seminar Series

Monday 15 September 2003

Prof E. Doedel
Computer Science
Concordia University, Montreal

Title: “Elemental Periodic Orbits of the Circular Restricted 3-Body Problem”

Time: 2:35 pm Room: Burnside 1205

Coffee and refreshments will be served after the seminar

Abstract: Periodic solutions of the Circular Restricted 3-Body Problem have been studied extensively in the literature, with many important contributions. These orbits are important in space-mission design, for example the Genesis mission, which was designed using dynamical systems concepts such as stable and unstable manifolds, is currently in a so-called Halo orbit (see <http://genesismission.jpl.nasa.gov/>).

In this talk I will show how boundary value continuation methods can be effective tools for studying these orbits and their bifurcations. In particular, I will show a selection of recent computational results for the families of periodic orbits that originate from the five libration points, and for some secondary bifurcating families. Specifically, I will show how extended boundary value systems can be used to track loci of these bifurcations. This results in a rather complete classification of the solution structure for all values of the mass-ratio of the primaries.

Time permitting, I will also mention extensions to the general 3-Body problem, with application to the celebrated figure-8 orbit of Chenciner, Montgomery, and Simo.

Various aspects of this work are in cooperation with Don Dichmann (Torrance CA), Jorge Galan and colleagues (Sevilla), Randy Paffenroth, Herb Keller (Pasadena), Andre Vanderbauwhede, Willy Govaerts (Gent), Yuri Kuznetsov (Utrecht), and graduate students Chenghai Zhang and Volodymyr Romanov (Montreal).

