Seminari Informal
de Matemàtiques de Barcelona

Speaker: Alexandra Lillo Escuder.
University: Universitat Politècnica de Catalunya.

Date: Wednesday, October 9th, 2024.
Schedule: 12:30 talk.
Place: UPC (FME aula 103) and Zoom.
Language: Catalan.

Title: Elliptic Restricted Three-Body Problem: Study of the ejection-collision orbits.

Abstract: In this work we will study the Elliptical Restricted Three-Body Problem, from a theoretical and numerical point of view. In this framework, we will have three celestial bodies, two of them massive and following elliptical orbits (also called primaries) and the third (the one that we are interested in studying its motion) considered massless.

In the first part, we will introduce the system of equations of motion, obtained after applying suitable changes of variables, and we will also see some important properties that will be useful later. In the second part, we will introduce a local regularization method, the so-called Levi-Civita method, since we need to be able to work with initial conditions starting in one of the primaries, in which position we have a singularity. We will deduce the equations of motion in the new variables and we will also see what happens with the previous properties in this new system of coordinates.

In the last part, we will perform a numerical analysis for finding a particular kind of orbits, the ejection-collision orbits. In order to do this, we will present a definition and a characterization that will allow us to compute these orbits, following an algorithm that we will explain step by step. Finally, we will explain the effects of the parameters of the system, in particular we will see how these parameters affect the number of n-ejection-collision orbits.

About us: *SIMBa* is a mathematics seminar organized by graduate students in the Barcelona area. It is aimed towards graduate and last–year undergraduate students. Our goals are disseminating knowledge from different branches of mathematics for those interested and promoting networking between the attendants.

This seminar is backed by the Faculty of Mathematics and Computer Science at Universitat de Barcelona, Faculty of Mathematics and Statistics at Universitat Politècnica de Catalunya, the Department of Mathematics at Universitat Autònoma de Barcelona, CRM, IMUB and BGSMath.

Fore more information, visit seminari-simba.github.io/en. You may contact us by sending an email to ***seminari.simba@gmail.com***.