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Title: *"The dynamics of a parabolic restricted three-body problem"*

Abstract. We consider the motion of an infinitesimal mass under the gravitational influence of two masses moving in parabolic orbits and in the same plane. The main features of the problem are the gradient-like character, the Hill's regions, and the invariant manifolds associated to the equilibrium points. From them, we describe the final evolutions of the solutions, forward and backward in time.

This model can be used to understand, at a basic level, the effect of a close encounter of two galaxies. Such a close encounter may cause a significant modification in the mass distribution. Taking into account just one particle within one galaxy, after the close encounter, the particle may jump to the other galaxy or escape. We study in the frame of the planar parabolic problem, the mechanisms that allow to explain the different behaviors. Furthermore, after a close encounter of two galaxies, brigdes and tails can be seen between or around them. A bridge would be a spiral arm between a galaxy and its companion, whereas a tail would correspond to a long and curving set of debris escaping from the galaxy. We use the model to a mechanism that explain the formation of bridges and tails.

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