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Title: *"A simple model for the location of Saturn's F ring"*

Abstract. In this paper, we introduce a simplified model to understand the location of Saturn's F ring. The model is a planar restricted five-body problem defined by the gravitational field of Saturn, including its second zonal harmonic J2, the shepherd moons Prometheus and Pandora, and Titan. We compute accurate long-time numerical integrations of non-interacting test-particles initially located in the region between the orbits of Prometheus and Pandora, and address whether they escape or remain trapped in this region. We obtain a wide region of initial conditions of the test particles that remain confined. We consider a dynamical stability indicator for the test particles' motion defined by computing the ratio of the standard deviation over the average value of relevant dynamical quantities, in particular, for the mean-motion and the semi-major axis. This indicator separates clearly a subset of trapped initial conditions that appear as very localised stripes in the initial semi-major axis and eccentricity space for the most stable orbits. Retaining only these test particles, we obtain a narrow eccentric ring which displays sharp edges and collective alignment. We relate the accumulation stripes of stable ring-particles to resonances, mostly involving Prometheus' outer Lindblad and co-rotation resonances, but not exclusively. Comparison of our results, including the angular precession of the ring, with the nominal data for the F ring shows some correspondence.

Joint work with Á. Jorba.