



In this thesis, we study the dynamics of an elastic body whose shape and position evolve due to the gravitational forces exerted by a point-like planet whose position is fixed in the space. The first result of the thesis is that, if any internal deformation of the body dissipates some energy, then the dynamics of the system has only three possible final behaviors:

- (i) the satellite is expelled to infinity;
- (ii) the satellite falls on the planet;
- (iii) the satellite is captured in synchronous resonance.

By item (iii) we mean that the shape of the body reaches a final configuration that a principal axis of inertia is directed towards the attracting planet and that the center of mass of satellite moves on a circle of constant radius.

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