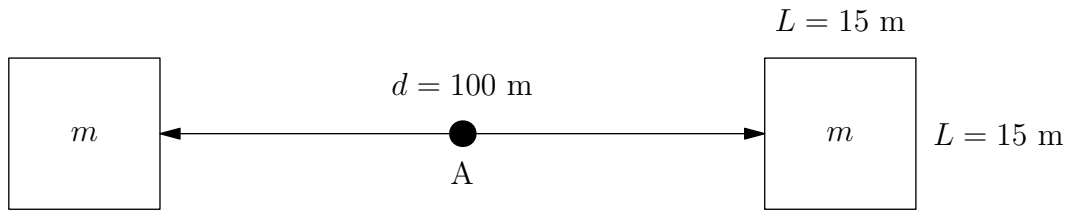# M04M.3—Panels in Space

Problem

A set of two rigidly linked panels is placed in outer space, where it can spin about 3 different axes. The panels are in the form of two thin, square, planar sections, $L = 15$ m on a side, each of mass $m = 3 \times 10^4$ kg. The two square sections are at a distance of $d = 100$ m and are connected with low-mass rigid beams (not shown in the figure).

a)   Compute the principal moments of inertia $I_1 > I_2 > I_3$ about the point A.

b)   After its construction, the set of panels was set spinning about the axis with the moment of inertia I_2, with its angular velocity chosen so that the pseudo-gravity at the center of each square section is $g/6$. Sadly, a tiny asteroid came by soon after and its impact nudged the angular velocity a little bit away from the "2nd axis". Show that the resulting motion of the panels will be perturbed strongly. What is the characteristic time for the perturbation to grow strong?