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Consider an object composing of two thin but rigid 6m x 6m square plates mass 2kg and 1 kg attached to a rigid 6m x 6m x 6m cubic of mass 4 kg as shown.

a) Obtain the inertia matrix of the rigid body w.r.t. the center of mass of the object expressed in x-y-z frame
b) Find the principle moments of inertia and directions of the three principle axes. Show the direction cosine matrix and draw the principle axes w.r.t. the x-y-z frame
c) Plot an ellipsoid of inertia with respect to x-y-z frame
d) Find the direction of a vector about which a minimum rotation will match x-y-z frame to the principal axes. What is this value of the minimum angle of rotation?
e) If this object is to undergo free motion. Indicate which of the principle axes about which the rotation will be stable.
f) Find the Euler equation of motion of the object in w.r.t. the principle axes.
g) If an impulse with amplitude 1 N.m. is applied to the largest principle axis, find angular velocity of the object.