

Space station

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This problem is still work in progress.

Imagine a space station, to which we attach a reference frame I . We assume that this frame is inertial over the time scale we will consider. Around this space station moved a satellite, to which we attach a frame S . Inside that satellite is a gyroscope, whose body B can rotate freely with respect to the satellite thanks to a gimbal.

1. Show that the angular velocity of the body with respect to the space station, expressed in the satellite frame, satisfies:

$${}_S\omega_{IB} = {}_S\omega_{IS} + R_{SBB}\omega_{SB}$$