Problem 15 (Rigid Body Dynamics)

(a) See provided solution file.

- ☑ In the case (4) where the angular velocity is approximately along the principle axis with the smallest inertia coefficient (1-axis), the angular momentum and angular velocity remain along this principal axis during the motion. The body exhibits stable rotation around the 1-axis (the body-fixed and inertial 1-axes stay approximately collinear). Similar behavior is also observed in the case (6), with respect to the principal axis with the largest inertia coefficient (3-axis).
  However, in the case (5), the angular velocity deviates from the initial axis of rotation (the 2-axis) and the motion loses stability. That is, rotation about the principle axis with the `middle' inertia coefficient is unstable.

(b) See provided solution file.