

# A Design Study Approach to Classical Control

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## Homework C.2

Using the configuration variables  $\theta$  and  $\phi$ , write an expression for the kinetic energy of the system.

## Solution

Since the satellite consists of two rotational masses, the kinetic energy is the sum of the rotational kinetic energy of each mass. Therefore the kinetic energy is given by

$$K = \frac{1}{2}J_s\dot{\theta}^2 + \frac{1}{2}J_p\dot{\phi}^2. \quad (1)$$