Problem 4

Determine: How long the torque must be applied to increase the rotational speed from 4 rad/s to 15 rad/s

\[ T_0 = 0.15 \text{m} \]

\[ 30 \text{kg} \]

\[ 2 \text{N.m} \]

\[ 25 \text{mm} \]

\[ 50 \text{N} \]

\[ (30 \text{kg})(9.81) \]

\[ 2 \text{N.m} \]

\[ 50 \text{N} \]

\[ (\overrightarrow{2M}_0 = I_0 \omega) \]

\[ 2 \text{N.m} - (50 \text{N})(0.025) = \left[ (30 \text{kg})(0.15 \text{m})^2 \right] \omega \]

\[ \omega = 1.11 \text{ rad/s}^2 \]
\[ \omega = \omega_0 + \omega t \]

\[ 15 \text{ rad/s} = 4 \text{ rad/s} + (1.11 \text{ rad/s}^2) \times + \]

\[ = 9.90 \text{ sec} \]