P4.1-5) A wind turbine motor applies a torque to the initially stationary blade assembly causing it to increase its angular speed as $\omega = bt$ rad/s, where $b = 0.3$ rad/s^2. Determine the velocity and acceleration of the blade tip (point A) after the blade assembly has made 5 full rotations. The length of one blade is $L = 30$ m.

Given:

Find:

Solution:

Angular Acceleration

Determine the angular acceleration of the blade assembly.

α = _____

Angular velocity

Calculate the blade's angular speed after 5 rotations.

ω_f = _____

Velocity

What is the velocity of the blade tip after 5 rotations?

$\mathbf{v}_A$ = _____

Acceleration

What is the acceleration of the blade tip after 5 rotations?

$\mathbf{a}_A$ = _____