Euler Forward Estimation of Torque to follow a Reference Velocity

We have the differential equation:

$$\dot{\omega} = \frac{T_P}{J}$$

Wherein T_P is the torque necessary to implement the speed profile. We approximate the differentiation by Euler Forward:

$$\frac{\omega[k+1] - \omega[k]}{\Delta t} = \frac{T_P}{J}$$

Derive T_P:

$$T_P = \frac{J}{\Delta t}(\omega[k+1] - \omega[k])$$

Put this into the differential equation $\dot{\omega}$:

$$\dot{\omega} = \frac{\frac{J}{\Delta t}(\omega[k+1] - \omega[k])}{J} = \frac{1}{\Delta t}(\omega[k+1] - \omega[k])$$

The right hand side of this equation is what the function returns.