



dt is sample time
 error = desired RPM - actual RPM

$$PWM(C(t)) = \begin{cases} 0 & \text{if } C(t) \leq 0 \\ \text{timer period} & \text{if } C(t) \geq \text{timer period} \\ P * error_n + D * \frac{error_n - error_{n-1}}{dt} + \max(I_{max}, I \sum_{i=\text{last zero error time}}^n error_i dt) & \text{otherwise} \end{cases}$$

Initial condition
 0.9 of integral
 @ last zero crossing

$I \sum_{i=\text{last zero error time}}^n error_i dt$