

$$(2) \quad J \dot{\omega}(s) = \frac{1}{J} (K_m I_a(s) - B \omega(s))$$

$$J s \omega(s) = K_m I_a(s) - B \omega(s)$$

$$I_a(s) = \frac{1}{K_m} (J s + B) \omega(s) \rightarrow (1)$$

$$(L_a s + R_a) \left[\frac{1}{K_m} (J s + B) \right] \omega(s) = E_a(s) - K_b \omega(s)$$

$$E_a(s) = \left(\frac{(L_a s + R_a)(J s + B)}{K_m} + K_b \right) \omega(s)$$

$$= \left[\frac{L_a J s^2 + (B L_a + R_a J) s + (B R_a + K_m K_b)}{K_m} \right] \omega(s)$$

$$G(s) = \frac{\omega(s)}{E_a(s)} = \frac{K_m}{L_a J s^2 + (B L_a + R_a J) s + (B R_a + K_m K_b)} \quad \checkmark \quad \omega(s)$$