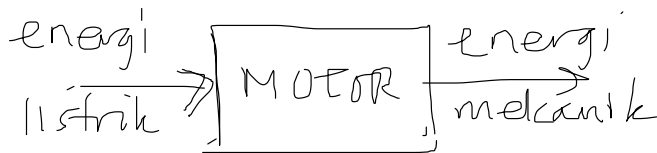


Bab I Pemodelan Motor DC (Armature Controlled)

* Model STATIS

$$1 \text{ RPM} = \frac{2\pi}{60} \text{ rad/sec}$$



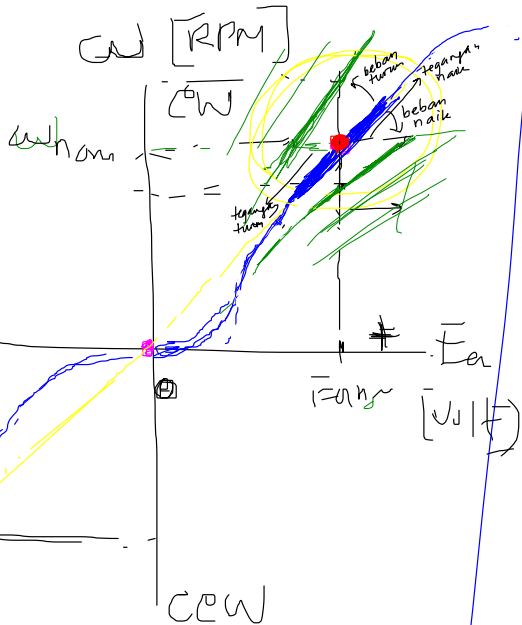
E_a
[V]



ω
[RPM, rad/sec]

$$\omega = K \cdot E_a$$

$$K = \frac{\omega_{nominal}}{E_{a \text{ nominal}}}$$



PPML Pemodelan dan Pengendalian Motor Listrik

8 pekan : Motor DC Terkendali Jangkar (Armature-Controlled DC Motor)

Tugas 1 (dikumpul 19/03/13)

Motor DC Terkendali Jangkar
 - Merk, Type: U.S. Motors
 - Spesifikasi: HP, P, ω_{nom} (RPM)
 - Data (R_a, L_a, J, B) rad/sec
 K_m, K_b I_a, E_a

Referensi:
<http://www.unhas.ac.id/rhiza/ditip/kuliah>
 → PPML

PENILAIAN!

* Tugas 2
 * Test tertulis

digabung
 dengan
 nilai dari
 pale Farza (TK)
 pale Safer (TE)

Materi = Bab I Pemodelan Motor DC

- * Model Statis
- * Model Dinamis/Analitik
 - Model Fisik
 - Model Nisbah Alih
 - Model Ruang Keadaan
- * Model Simulink/Numerik

Bab II Pengendalian Motor DC

- * Pengendalian Open-Loop
 START/STOP
- * Pengendalian Closed-Loop
 (dengan feedback)

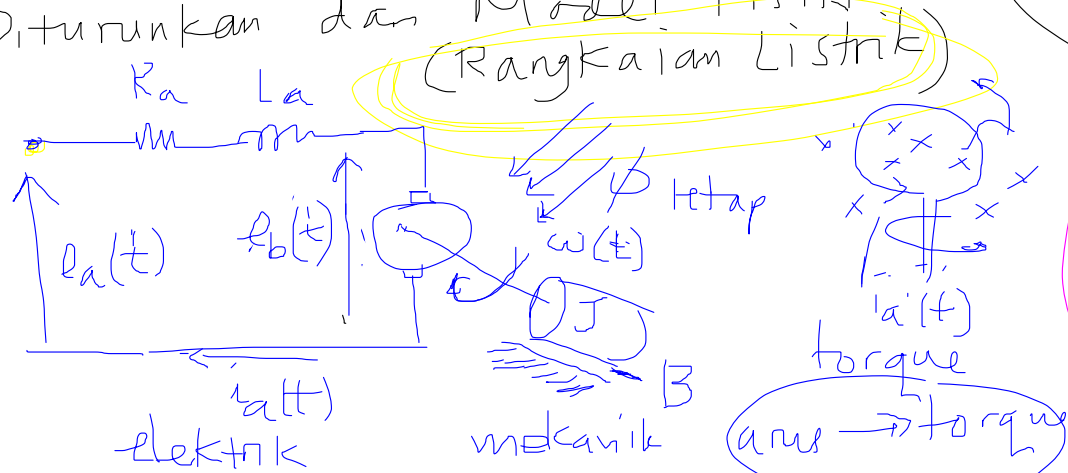
ω_{nom} = Kecepatan NOMINAL

$E_{a \text{ nom}}$ = Tegangan Jangkar NOMINAL

Model Statis =
 * Model steady state (Keadaan Tunak)
 * Watak Alih (Transfer characteristic)

* Model Dinamik

Diturunkan dari Model Fisik



* Rangkaian Listrik : (Hukum Ohm)

$$(1) \quad e_a(t) - e_b(t) = R_a i_a(t) + L_a \frac{di_a(t)}{dt}$$

* Mekanik (Hukum Newton)

$$(2) \quad T(t) = J \frac{dw(t)}{dt} + Bw(t)$$

$$T(t) \equiv \text{torque} : [\text{N} \cdot \text{m}]$$

$$\left[\text{kg} \cdot \text{m} / \text{sec}^2 \right] = \left[\frac{\text{kg} \cdot \text{m}^2}{\text{sec}^2} \right]$$

$$\frac{dw(t)}{dt} = \left[\frac{\text{rad}}{\text{sec}^2} \right]$$

$$B = \left[\frac{\text{N} \cdot \text{m}}{\text{rad} / \text{sec}} \right]$$

$$w(t) = \left[\frac{\text{rad}}{\text{sec}} \right] \sim [\text{RPM}] = \left[\frac{\text{kg} \cdot \text{m}^2}{\text{rad} \cdot \text{sec}} \right]$$

$$J = \left[\frac{\text{N} \cdot \text{m}}{\text{rad} / \text{sec}^2} \right] = \left[\frac{\text{kg} \cdot \text{m}^2}{\text{rad}} \right]$$

$$\hookrightarrow [\text{lb} \cdot \text{ft}^2] \sim [\text{kg} \cdot \text{m}^2]$$

Nominal

$E_a, P \text{ (HP)}$

I_a, R_{PM}

R_a, L_a, J, B
 K_m, K_b

* Sifat Motor

$$(3) \quad T(t) = K_m i_a(t)$$

* Sifat Generator

$$(4) \quad e_b(t) = K_b w(t)$$

K_m = konstanta motor

K_b = konstanta generator