

Pembagian Tegangan:

$$I(s) = \frac{V_i(s)}{R + sL} = \frac{V_i(s)}{R + Ls}$$

$$V_C(s) = I(s) \cdot \frac{1}{sC} = \frac{V_i(s)}{R + Ls} \cdot \frac{1}{sC}$$

$$\left(\frac{1}{C} + \frac{1}{R + Ls}\right) V_C(s) = \frac{V_i(s)}{R + Ls}$$

$$G(s) = \frac{V_C(s)}{V_i(s)} = \frac{1}{sC + \frac{R + Ls}{R + Ls}} = \frac{1}{sC + 1 + \frac{L}{R}} = \frac{1}{sC + 1 + \frac{L}{R}}$$

$$= \frac{1}{LCs^2 + RCs + 1} = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

$$G(s) = \frac{K}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

$$K = \omega_n^2 \quad \omega_n^2 = \frac{1}{LC} \rightarrow \omega_n = \frac{1}{\sqrt{LC}} \rightarrow f_n = \frac{1}{2\pi\sqrt{LC}}$$

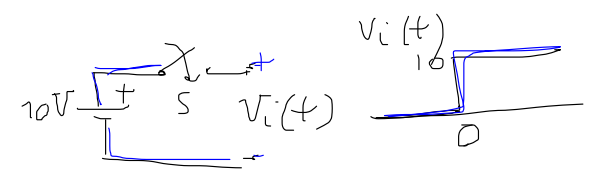
$$2\zeta\omega_n = \frac{R}{L} \rightarrow \zeta = \frac{R}{2L\omega_n} = \frac{R}{2L} \sqrt{LC}$$

$\zeta > 1 \rightarrow$  overdamped

$\zeta = 1 \rightarrow$  critically damped

$0 < \zeta < 1 \rightarrow$  underdamped

$\zeta = 0 \rightarrow$  oscillation  $\rightarrow f_n = \frac{1}{2\pi\sqrt{LC}}, R = 0$



$$V_i(t) = 10u(t)$$

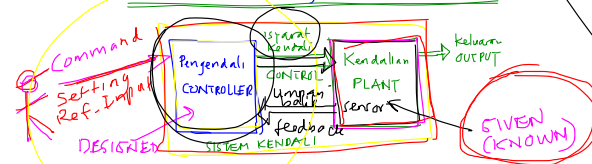
$$V_i(s) = \frac{10}{s}$$

$$V_C(s) = \frac{10}{s} \cdot \frac{K}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

$$V_C(t) = \mathcal{L}^{-1} \left[ \frac{10K}{s(s^2 + 2\zeta\omega_n s + \omega_n^2)} \right]$$

analitik  $\rightarrow$  Accuan EXACT

Perancangan SISTEM KENDALI 2014  
Project Course  $\rightarrow$  TIRAK ADA UJIAN!  
\* Cari partner!  
\* Akses MATLAB minimal Matlab 7  
Setiap pekan mulai bulan April ke SENIN  
PBT 303 78781 atau 782 yang ada LCD nya, atau di LKSI.  
Referensi Course Website:  
<http://www.unhar.ac.id/strata/arsip/kuliah/>  
Perancangan Sistem Kendali



Merancang Sistem Kendali (Control System Design)

- \* Sistem Kendali OPTIMAL
- \* Sistem Kendali ADAPTIF
- \* Sistem Kendali CERDAS
- \* Sistem Kendali PROSES  $\rightarrow$  Process Plant
- \* Sistem Kendali KOKOH (Robust)
- \* dll.

next, VERIFIKASI SIMULINK  
project 3

ALAT DESIGN:  
Simulink @ MATLAB

PEMODELAN & SIMULASI

- \* VALIDASI  $\rightarrow$  Pengamat FISIK
- \* VERIFIKASI

tanpa pengamatan FISIK

Pembandingan: ANALISIS

Hasil ANALITIK: EXACT akurat

ERRORE galat