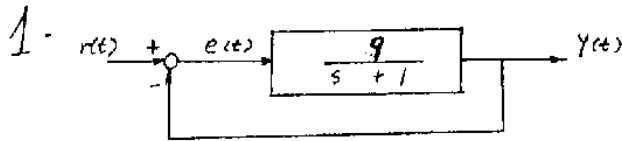


國立中央大學八十七學年度碩士班研究生入學試題卷

所別: 電機工程研究所 丙組 科目: 控制系統 共 2 頁 第 1 頁



20% Assume that the input is $r(t) = 4.00 + 0.200 \cos 377t$. Find the steady state error $e_{ss}(t)$ for the error $e(t)$.

2. Consider a feedback system with the open-loop transfer function as

$$G(s) = \frac{200}{s(s+10)^2}$$

10% Find the gain margin of the closed-loop system.

3. Given a plant with transfer function $G(s) = \frac{s-2}{(s+1)(s-1)}$.

A unity-feedback system with a cascade controller $C(s)$ is now considered.

20% (a) Design the first-order $C(s)$ such that the three poles of the overall system are -3 , $-2+j$ and $-2-j$. (10%)

(b) Design a precompensator such that the designed system in (a) will track asymptotically step-reference inputs. (10%)



注: 背面有試題

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4. Given $\underline{A} = \begin{bmatrix} 0 & -3 & 0 \\ 3 & 0 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

a) Find \underline{A}^T using the Cayley-Hamilton theorem. (10%)

b) Compute $e^{\underline{A}t}$. (10%)

5. Show that the system observability is invariant for output feedback and not for state feedback (20%)

6. Show that if a continuous-time, linear constant system is asymptotically stable, then its adjoint is unstable (10%)