國立臺北科技大學 101 學年度碩士班招生考試

系所組別：1420 能源與冷凍空調工程系碩士班乙組

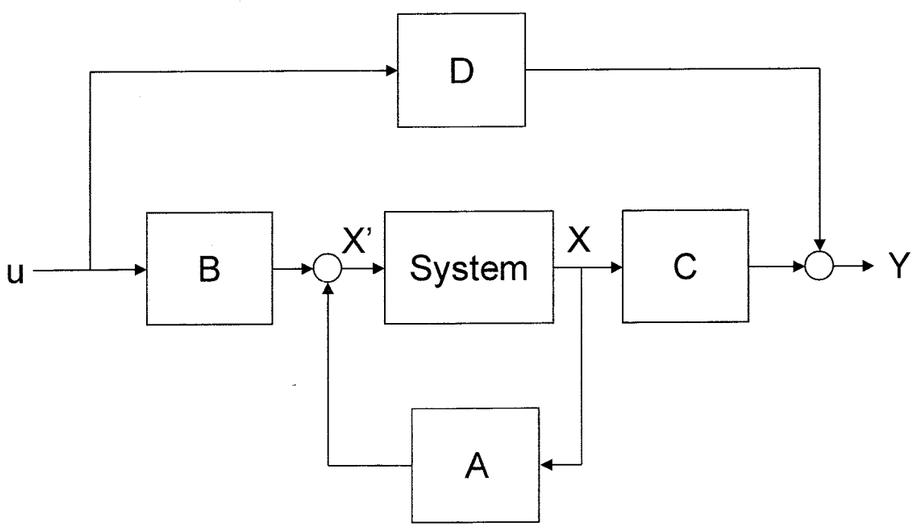
第二節　自動控制　試題

注意事項：

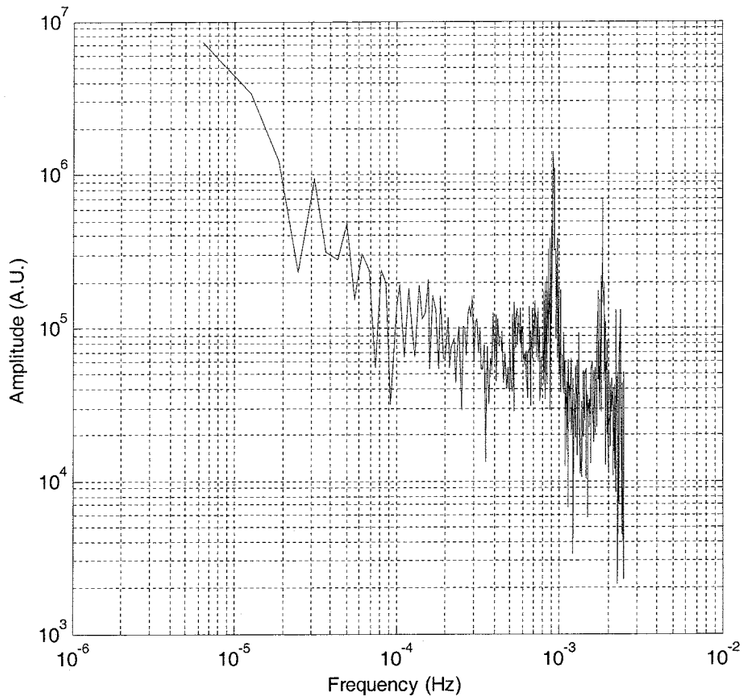
1. 本試題共 5 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Write down the definition of Laplace Transform (5 pts). Explain the meaning of Laplace variable, s (5 pts) and show how to evaluate the convergence of a dynamic control system by Laplace Transform (10 pts).

2. A modern control system has a block as the following figure. Derive state space equations by four matrices, A, B, C, D, input function, u, output function, Y, and the system variable X (10 pts). Explain how to evaluate the convergence of a dynamic control system by four matrices (10 pts).

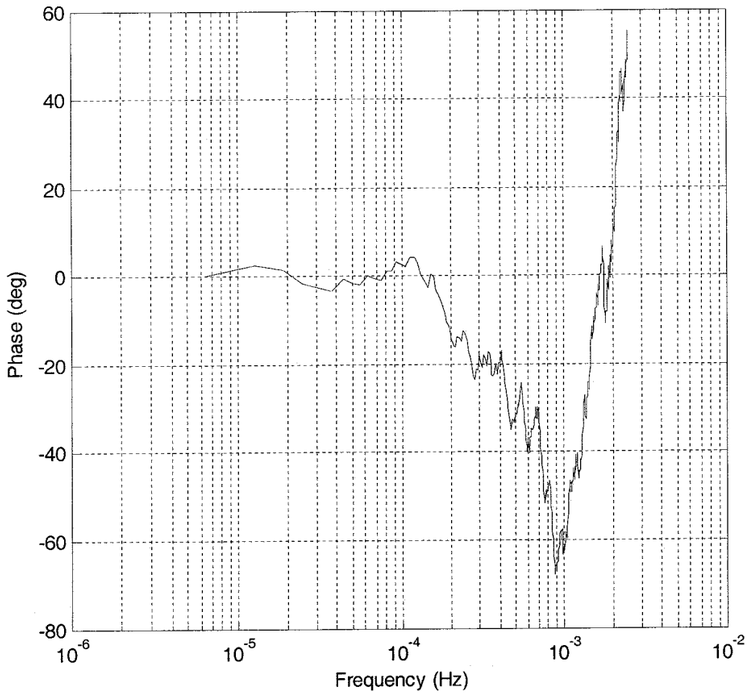


3. Power demands of an air conditioning zoom have the frequency response as following two figures. Estimate the possible false control of this air conditioning system (20 pts).



(a) Gain with arbitrary unit

注意：背面尚有試題



(b) Phase in degree

4. Inverter control is an effective way for energy saving control of HVAC equipments. Explain its working principals (10 pts) and illustrate how to achieve water pump energy saving by ΔP-Q curve (10 pts).

5. Wireless sensor networks are expected to being a power tool for future smart living space. Describe the main communication protocol specified by IEEE standard (10 pts) and illustrate features of sensor communication (10 pts).