大葉大學 98 學年度　研究所碩士班　招生考試試題紙					
系　所　別	組別	考　試　科　目 （中文名稱）	考試 日期	節次	備　註
電機工程	乙	控制系統	4月12日	第 2 節	可用計算機 共一頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

※（只能選擇一考科作答，不可跨考科作答）

1. **(20%)**

   (1) What is Tustin's binear transformation? (10%)

   (2). If $G(s)=\frac{5}{S^2+3s+2}$, sampling time is 0.1 second, what is G(z) using binear transformation? (10%)

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2. **(20%)**

   (1). If $y_k=1.724y_{k-1}-0.7408y_{k-2}+0.02264u_{k-1}+0.02049u_{k-2}$, where y_k is the output and u_k is the input, then what is its transfer function between output and input?(10%)

   (2). What is the root locus of the above transfer function in (1)?(10%)

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3. **(20%) If the plant transfer function $G(s)=\frac{5}{S^2+3s+2}$, design a compensator such that the closed loop transfer function has characteristics (1) steady-state error is zero under unit-step function input. (2) damping ratio ζ is about 0.707.**

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4. **(20%) Using the above plant in problem 3, design a compensator such that the closed-loop system has a phase margin of 60° and a gain margin of 6dB.**

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5. **(20%) Using the above plant in problem 3, design a state feedback control such that the closed-loop system has poles located at -5+j and -5-j (complex roots).**