國立臺灣海洋大學101學年度研究所碩士班暨碩士在職專班入學考試試題

考試科目：工程數學(不含機率及複變)

系所名稱：通訊與導航工程學系碩士班電子導航與定位組　　* 可使用計算器

1.答案以橫式由左至右書寫。2.請依題號順序作答。

1. Solve the following initial value problems

(a) $y''(t)+2y'(t)-3y(t)=e^{-2t}$; $y(0)=\frac{2}{3}$, $y'(0)=-\frac{1}{3}$. (15%)

(b) $y''(t)-6y'(t)+9y(t)=0$; $y(0)=2$, $y'(0)=5$. (15%)

2. Solve the following differential equation (15%)

$$e^t\sin(y)-2t+(e^t\cos(y)+1)y'=0.$$

3. Find the inverse Laplace transform of the functions (20%)

(a) $\frac{s+4}{s^2+4s+20}$; (b) $\frac{1}{s(s+4)}e^{-2s}$

4. Suppose $A=\begin{bmatrix}1&0&1\\0&0&1\\2&0&3\end{bmatrix}$. Find

(a)the determinant of A. (5%)

(b) the rank of A. (5%)

(c)the kernel of A. (10%)

5. Solve the integral equation of the form (15%)

$$f(t)=e^{-3t}[e^t-3\int_0^t f(\alpha)e^{3\alpha}d\alpha]$$