國立臺灣科技大學

八十九學年度碩士班招生考試試題

系所組別： 機械工程系甲組、機械工程系乙組、機械工程系丙組、機械工程系丁組、機械工程系戊組

科　目： 工程數學

(1). Find the perpendicular distance from a point (4, 5) to a line $x + 2y = 3$. (20%)

(2). Determine the inverse of the following 2 x 2 matrix. (20%)

$$\begin{matrix} 1 & 2 \\ 3 & 4 \end{matrix}$$

(3). Find a general solution of the following equation. (20%)

$$y'' + 2y' + y = e^{-x}$$

(4). Evaluate the following integration. (20%)

$$\int_{-\infty}^{\infty} \frac{dx}{(1+x^2)^3}$$

(5). Solve the partial differential equation by Fourier sine transformation. (20%)

$$u_t - u_{xx} = 0$$

for $0 < x < \infty$, $t > 0$, $u(0, t) = g(t)$, $u(x,0) = 0$, and $u(x, t)$ is bounded.