國立中央大學98學年度碩士班考試入學試題卷

所別：企業管理學系碩士班 一般類組(乙組)　科目：工程數學　共 一 頁 第 一 頁

＊請在試卷答案卷（卡）內作答

1. (12 pts.) Please solve $y''-2y'+y=\dfrac{e^x}{x}$

2. (12 pts.) Please solve $2xyy'+(x-2)y^2=x^3e^x$

3. (12 pts.) Please solve $y'=\dfrac{\cosh x\cos y}{2\sinh x\sin y}$

4. (12 pts.) Use power series to solve $(1-x^2)y''-2xy'+2y=0$

5. (15 pts.) Laplace Transform

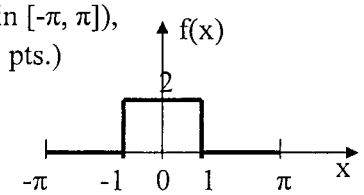
   (1) Find the inverse Laplace transform of $\dfrac{s^3-6s^2+11s-6}{(s^2-4s+5)^2}$ (8 pts.)

   (2) Please solve $y(x)=x^2-e^{-x}-\int_0^x y(\tau)e^{x-\tau}d\tau$ (7 pts.)

6. (15 pts.) Fourier analysis

   (1) Please calculate the Fourier Transform of $f(x)=\sqrt{\dfrac{6}{\pi}}e^{-\frac{3}{2}x^2}$ (7 pts.)

   (2) Please find the Fourier Series of the following function (f(x)=2, -1<x<1 and =0, elsewhere in [-π, π]), which has a period of 2π (8 pts.)



7. (12 pts.) Please solve the following initial value problem of a nonhomogeneous linear system:

   $y_1'=6y_1+y_2+6x$

   $y_2'=4y_1+3y_2-10x+4$

8. (10 pts.) Please solve $y'=\dfrac{2x-5y-9}{-4x+y+9}$