

中國文化大學 九十三 學年度 第一學期 期中 考試試卷					
考試科目	任課老師	系級	考試日期	份數	備註
工程數學	陳為仁	機二 A	93/11/17	75	closed books

- Given the following differential equation $xy' + y = y^2$.
 - Determine if the given differential equation is separable.
 - Determine if the given differential equation is linear.
 - Determine if the given differential equation is Bernoulli differential equation.
 - Give the order and degree of the equation.
 - Find the general solution.
- The charge $q(t)$ in an RC circuit satisfies the linear differential equation

$$q' + \frac{1}{RC}q = \frac{1}{R}E(t)$$
 - Solve the charge $q(t)$ if $E(t)=E$, constant. Evaluate the constant of integration by using initial condition $q(0)=q_0$.
 - Solve the charge $q(t)$ if $E(t)=E\cos(\omega t)$. Evaluate the constant of integration by using initial condition $q(0)=q_0$.
- Given the following differential equation $1 + (3x - e^{-2y})y' = 0$.
 - Show that the given differential equation is not exact.
 - Find an integrating factor.
 - Find its general solution.
- Given $x^2y'' - 7xy' + 16y = 0$; $y_1(x) = x^4$, $y_2(x) = x^4 \ln x$
 - Prove that $y_1(x)$ and $y_2(x)$ are solutions of the equation..
 - Show that $y_1(x)$ and $y_2(x)$ are linearly independent.
 - Write the general solution $y(x)$.
- 用待定係數法(method of undetermined coefficients)可求 $y'' - 4y' + 4y = f(x)$ 方程式的特解 $y_p(x)$ ，請寫出正確的 $y_p(x)$ 解的型式(不用求解!)若 $f(x)$ 為(a) $8x^2-2x$, (b) $e^{2x} \cos(2x)$, (c) $4e^{2x}$, 或 (d) xe^{2x} 。
- Find the general solution of differential equation $y'' + 4y = 4\sinh(2x)$.