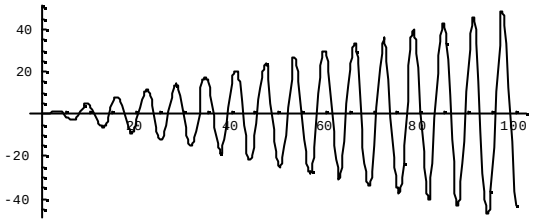
工數二(B)第二次大考解答(二高階 ODE)

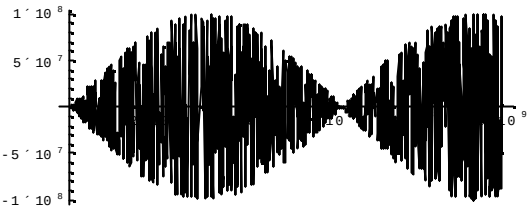
1. $y = c_1 + c_2 x + c_3 x^2$， $y = c_1 e^x + c_2 x e^x + c_3 x^2 e^x$

2. $y = \dfrac{1}{1-\Omega^2}[Sin(\Omega t) - \Omega Sin(t)]$

共振



拍擊



3. $x^3 y''' = Y'''(t) - 3Y''(t) + 2Y'(t)$

4. $y = c_1(1 + x ln\sqrt{\dfrac{x-1}{x+1}})$

5. $y = c_1 x^5 + c_2 x^{-2}$

6. $y_p = x$

7. 當外力項=0 時，產生 Free vibration；外力項$\neq 0$ 時，產生 Forced vibration

8. $y = ce^{-t}$

9. $y_p = \dfrac{1}{2}Sin(t) + \dfrac{1}{2}Cos(t)$

10. $y_p = \dfrac{1}{2}Sin(t) - \dfrac{1}{2}Cos(t)$

11. $y_p = Sin(t)$

12. Wronskain 可用來判斷解為相依或是獨立，W=0 時線性相依，反之則為線性獨立

$$W = \begin{vmatrix} Sin(x) & Cos(x) & e^{ix} \\ Cos(x) & -Sin(x) & ie^{ix} \\ -Sin(x) & -Cos(x) & -e^{ix} \end{vmatrix} = 0,$$ They are dependent.

13. $$W = \begin{vmatrix} Sinh(x) & Cosh(x) & e^x \\ Cosh(x) & Sinh(x) & e^x \\ Sinh(x) & Cosh(x) & e^x \end{vmatrix} = 0,$$ They are dependent.

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