

9 先週の quiz の略解

9.1 2階線形同次微分方程式

- (1) $y'' - 4y' + 8y = 0 \rightsquigarrow y(x) = e^{2x}(A \cos 2x + B \sin 2x), A = -B = 1.$
 (2) $y'' - 10y' + 29y = 0 \rightsquigarrow y(x) = e^{5x}(A \cos 2x + B \sin 2x), A = 1, B = -\frac{5}{2}.$
 (3) $y'' - 8y' + 16y = 0 \rightsquigarrow y(x) = (Ax + B)e^{4x}, A = -4, B = 1.$

9.2 2階線形同次微分方程式

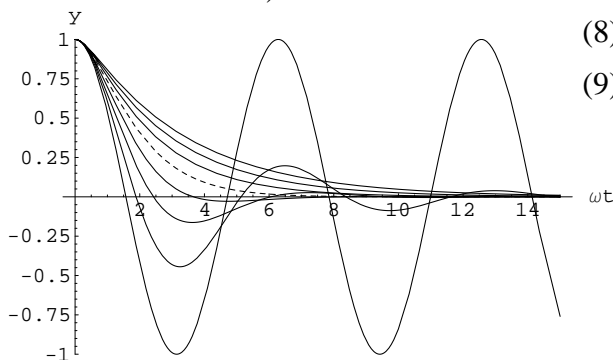
- (4) $y'' - 6y' + 8y = 0 \rightsquigarrow y(x) = Ae^{4x} + Be^{2x}, A = -B = \frac{1}{2}.$
 (5) $y'' - 6y' + 9y = 0 \rightsquigarrow y(x) = (Ax + B)e^{3x}, A = 1, B = 0.$
 (6) $y'' - 6y' + 10y = 0 \rightsquigarrow y(x) = e^{3x}(A \cos x + B \sin x), A = 0, B = 1.$

減衰振動, 臨界制動, 過減衰

$$y''(t) + ky'(t) + \omega^2 y(t) = 0,$$

$$y'(0) = 0, \quad y(0) = 1$$

$k/\omega = 3.5, 3.0, 2.5, 2.0$ (波線), $1.5, 1, 0.5, 0.0$
 ($\omega t = 0$ 付近で上から)



10 今週の quiz

10.1 2階線形同次微分方程式

初期条件 $y(0) = 1, y'(0) = 0$ のもとで次の微分方程式を解け.

- (7) $y'' - 6y' + 8y = x + 1,$
 (8) $y'' - 6y' + 9y = 13 \cos 2x,$
 (9) $y'' - 6y' + 10y = 2e^{-2x}.$

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