Subject | موضوع الدرس: معادلات تفاضلية | Date | التاريخ

differential equations
- ordinary → $y = f(x) \rightarrow y', y'', y''', \dots$
- Partial → $Z = Z(x,y) \rightarrow Z_x, Z_y, Z_{xx}$

Function $\xrightarrow[\text{Integ.}]{\text{derv.}}$ ordinary code)

① $y = A\cos\omega x + B\sin\omega x$

$y' = -A\omega\sin(\omega x) + B\omega\cos(\omega x)$

$y'' = -A\omega^2\cos(\omega x) - B\omega^2\sin(\omega x)$

$y'' = -\omega^2[A\cos\omega x + B\sin\omega x]$

$y'' = -\omega^2 y$

② $2(x-\alpha) + 2(y-\beta)y' = 0$

$2 + 2(y-\beta)y'' + 2(y')^2 = 0$

$\Rightarrow (y-\beta) = -\dfrac{2 + 2(y')^2}{2y''} = \dfrac{1+(y')^2}{y''}$

③ $y = Ae^{2x} + Be^{-2x}$

$y' = 2Ae^{2x} - 2Be^{-2x}$

$y'' = 4Ae^{2x} + 4Be^{-2x} = 4(y)$

$y'' = 4(y)$

④ $y = Ax + A^2$

$y' = A$

$y = y'x + (y')^2$