ph260 Ffiseg damcaniaethol 2 — taflen gymorth

Mae'r tabl yma'n rhestri yr hafaliadau defnyddiol a drafodwyd yn y ddarlith yn nhrefn eu ymddangosiad cyntaf. Dylwch fod yn gallu erbyn hyn i adio'r stratagaethau datrys a'r datrysiadau eu hun.

HDC gwahanadwy

$\frac{\mathrm{d}y}{\mathrm{d}x} = f(x)$

HDC gradd 1af llinol

$\frac{\mathrm{d}y}{\mathrm{d}x} + p(x)y = q(x)$

Bernoulli

$\frac{\mathrm{d}y}{\mathrm{d}x} + p(x)y = q(x)y^n$

HDC gradd 1af homogenaidd

$p(x,y)\mathrm{d}x + q(x,y)\mathrm{d}y = 0$

Laplace

$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$

HDC llinol homogenaidd gyda cyfernod cyson

$a_n \frac{\partial^{(n)} y}{\partial x^n} + \cdots + a_1 \frac{\mathrm{d}y}{\mathrm{d}x} + a_0 y = 0$

HDC llinol heterogenaidd gyda cyfernod cyson

$a_n \frac{\partial^{(n)} y}{\partial x^n} + \cdots + a_1 \frac{\mathrm{d}y}{\mathrm{d}x} + a_0 y = f(x)$

Cyfres sin Fourier

$f(x) = \sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{l}; \qquad b_n = \frac{2}{l} \int_0^l f(x) \sin \frac{n\pi x}{l} \mathrm{d}x$

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useful trigonometric and hyperbolic identities in this context:

$\sin nx = \frac{\mathrm{e}^{jnx} - \mathrm{e}^{-jnx}}{2j}; \qquad \cos nx = \frac{\mathrm{e}^{jnx} + \mathrm{e}^{-jnx}}{2}; \qquad \sinh nx = \frac{\mathrm{e}^{nx} - \mathrm{e}^{-nx}}{2}; \qquad \cosh nx = \frac{\mathrm{e}^{nx} + \mathrm{e}^{-nx}}{2}$

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diffusion eq.

$\frac{\partial^2 z}{\partial x^2} = a \frac{\partial z}{\partial t}$

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wave eq.

$\frac{\partial^2 z}{\partial x^2} = a \frac{\partial^2 z}{\partial t^2}$

Fourier transform

$f(x) = \int_{-\infty}^{\infty} g(q)\mathrm{e}^{jqx} \mathrm{d}q; \qquad g(q) = \frac{1}{2\pi} \int_{-\infty}^{\infty} f(x)\mathrm{e}^{-jqx} \mathrm{d}x$