

integrate $\exp(-ax^2)$ from $x=0$ to infinity

Definite integral:

$$\int_0^{\infty} \exp(-a x^2) dx = \frac{\sqrt{\pi}}{2\sqrt{a}} \text{ for } \operatorname{Re}(a) > 0$$

series sqrt(x^2+1) about $x=0$

Series expansion at $x=0$:

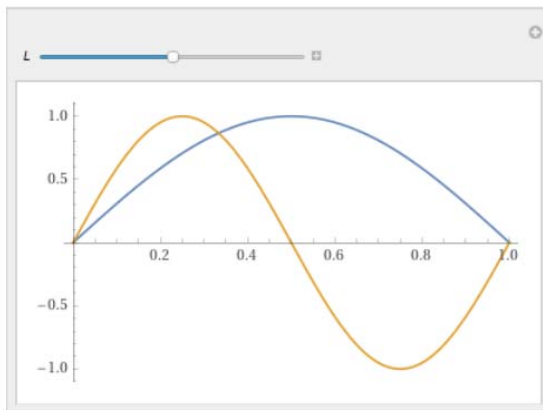
$$1 + \frac{x^2}{2} - \frac{x^4}{8} + \frac{x^6}{16} - \frac{5x^8}{128} + O(x^9)$$

(Taylor series)

Approximations about $x=0$ up to order 2:

plot $\sin(\pi x/L)$, $\sin(2\pi x/L)$ for x from 0 to L

Result:



diagonalize matrix

 Extended Keyboard

 Upload

Computational Inputs:

» matrix:

Compute

Input interpretation:

diagonalize

$$\begin{pmatrix} 1 & 1 & 3 \\ 1 & 2 & 1 \\ 3 & 1 & 3 \end{pmatrix}$$

Result:

$$M = S.J.S^{-1}$$



where

$$M = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 2 & 1 \\ 3 & 1 & 3 \end{pmatrix}$$

$$S \approx \begin{pmatrix} -1.43944 & 0.426749 & 0.739965 \\ 0.138183 & -2.79137 & 0.471373 \\ 1 & 1 & 1 \end{pmatrix}$$

$$J \approx \begin{pmatrix} -1.18014 & 0 & 0 \\ 0 & 1.48887 & 0 \\ 0 & 0 & 5.69127 \end{pmatrix}$$

solve differential equation $y'' + y = 0$

 Extended Keyboard  Upload



Input interpretation:

solve $y''(x) + y(x) = 0$

Result:

$$y(x) = c_2 \sin(x) + c_1 \cos(x)$$

derivative sqrt(1+x^2)

 Extended Keyboard  Upload

Derivative:

$$\frac{d}{dx}(\sqrt{1+x^2}) = \frac{x}{\sqrt{1+x^2}}$$