Goodhead Ifeanyi Isaac
Mechanical Engineering
18/Eng06/024
Engineering Mathematics

1) Show that the limit of the function given in equation (1.1) as x approaches 0 is a/b

$$f(x) = \frac{\sin a(x)}{bx}$$

Solution

Direct substitution

$$\lim_{x \to 0} \frac{\sin ax}{bx} = \frac{\sin a(0)}{b(0)}$$

$$= \frac{0}{0} = \text{Indeterminant}$$

Using L'hopitals rule

$$\lim_{x \to 0} \frac{\sin ax}{bx} = \frac{a \cos ax}{b} = \frac{a \cos a(0)}{b} = \frac{a}{b}$$

b ~~The model of~~

$\delta = 0.1$ $\Delta\sigma = 0.01$ $6 - 0.1 = 5.9$

$\varepsilon = 0.5$ $\Delta\varepsilon = 0.5$ $9 - 0.5 = 8.5$

0.01 + x	0.05 + y	x - 0.01	y - 0.01
5.71	8.50	6.1	9.5
5.71	8.55	6.09	9.45
5.72	8.60	6.08	9.4
5.73	8.65	6.07	9.35
5.94	8.70	6.06	9.3
5.75	8.75	6.05	9.25
5.76	8.80	6.04	9.2
5.77	8.85	6.03	9.15
5.98	8.90	6.02	9.1
5.99	8.95	6.01	9.05
6.	9	6	9

3. Show whether the function given in Equation (1.3) is continuous on the interval [-5; 5].

$f(x) = (25 - x^2)^{1/2}$

- for -5

$\lim_{x \to -5} (25 - (-5)^2)^{1/2}$.

$(25 - 25)^{1/2} = 0$

for -4

$\lim_{x \to -4} (25 - (-4)^2)^{1/2}$

$(25 - 16)^{1/2} = 3$

for -3

$\lim_{x \to -3} (25 - (-3)^2)^{1/2}$

$(25 - 9)^{1/2} = 4$

for -2

$\lim_{x \to -2} (25 - (-2)^2)^{1/2}$

$(25 - 4)^{1/2} = 4.58$

for -1

$\lim_{x \to -1} (25 - (-1)^2)^{1/2}$

$(25 - 1)^{1/2} = 4.89$

for 0

$\lim_{x \to 0} (25 - (0)^2)^{1/2}$

$(25 - 0)^{1/2} = 5$

for 1

$\lim_{x \to 1} (25 - (1)^2)^{1/2}$

$(25 - 1)^{1/2} = 4.89$

for 2

$\lim_{x \to 2} (25 - (2)^2)^{1/2} = 4.58$

for 3:

$\lim (25-(3)^2)^{1/2} = 4$

for 4

$\lim_{x \to 4} (25-x^2)^{1/2} = (25-(4)^2)^{1/2} = 3$

for 5

$\lim_{x \to 5} (25-x^2)^{1/2} = (25-(5)^2)^{1/2} = 0$

the function $f(x) = (25-x^2)^{1/2}$ is continuous on the interval $[-5, 5]$