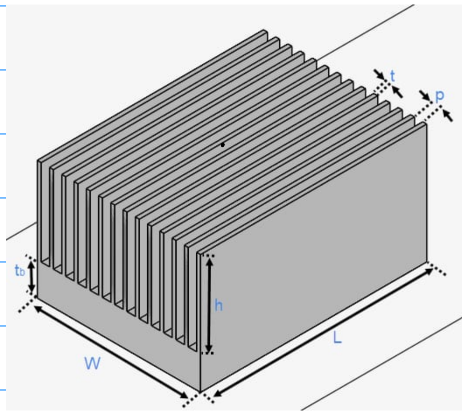
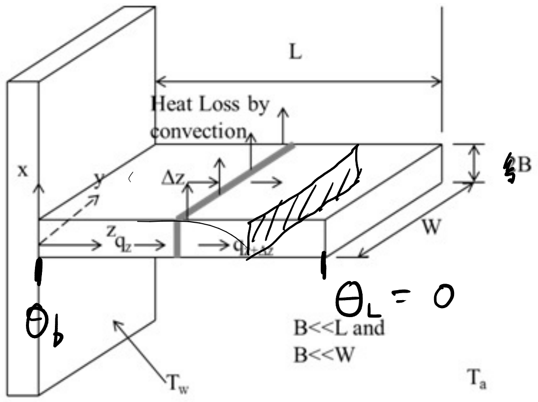
Problema 1: Transferencia de calor en supericies extendidas



$$\frac{d^2T}{dx^2} = \frac{hP}{kA_c}\left(T - T_\infty\right).$$

Infinite Fin Length	$\boxed{\frac{\theta}{\theta_b} = e^{-mx}}$



$$\Theta = T - T_\infty$$

$$\frac{d^2\Theta}{dx^2} = \underbrace{\frac{hP}{KA_c}}_{m^2}\Theta$$

$$\frac{d^2\Theta}{dx^2} = m^2\Theta \rightarrow \boxed{\frac{d^2\Theta}{dx^2} - m^2\Theta = 0}$$

$$\begin{matrix}0\\ \vdots\\ n-1\end{matrix}[\psi][\alpha] = [\Theta]$$

$$L(\Theta) = 0 \longrightarrow L(\cdot) = \frac{d^2(\cdot)}{dx^2} - m^2(\cdot)$$

$$\left.\boxed{\begin{matrix}\Theta(0) = \Theta_b\\ \Theta(L) = 0\end{matrix}}\right\} B(\cdot) = (\cdot)$$

$$\Theta = \sum_{i=0}^{N-1} \alpha_i \psi_i$$

$$[A][\alpha] = [B]$$

$$L(\Theta) = \sum_{i=0}^{N-1} \alpha_i L(\psi_i) = f(x)$$

$$B(\Theta) = \sum_{i=0}^{N-1} \alpha_i B(\psi_i) = g(x)$$

$$\boxed{\begin{pmatrix}[L(\psi)]\\ [B(\psi)]\end{pmatrix}\begin{pmatrix}\alpha\end{pmatrix} = \begin{pmatrix}[F(x)]\\ [g(x)]\end{pmatrix}}$$

MQ $\boxed{\psi = \sqrt{r^2+c^2}}$

$$r = \sqrt{(\bar{x}-\bar{\xi})^2} \qquad \text{3-D}$$

$$\boxed{\frac{d\psi}{dr} = \frac{r}{\sqrt{r^2+c^2}}}$$

$$r = \sqrt{(x-\xi)^2} = |(x-\xi)|$$

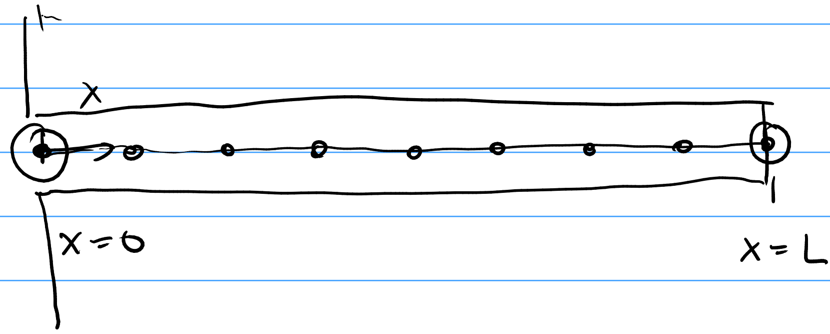
$$\boxed{\frac{d^2\psi}{dr^2} = \frac{1}{\sqrt{r^2+c^2}} - \frac{r^2}{(r^2+c^2)^{3/2}}}$$

$$\frac{dr}{dx} = \frac{x-\xi}{r}$$

$$\frac{d^2\psi}{dr^2} = \frac{d^2\psi}{dx^2}$$

$$\frac{d\psi}{dx} = \frac{dr}{dx}\frac{d\psi}{dr}$$

$$\frac{d\psi}{dx} = \frac{x-\xi}{\sqrt{r^2+c^2}}$$



Problema 2:

$$x^2 y'' + xy' + y = 0, \quad y(1) = 0, \quad y(2) = 0.638961$$

Solución analítica $y = \sin(\ln x).$

$$L(y) = x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$$

$$B(y) = y = \begin{cases} 0 & , x = 1 \\ 0.638961 & , x = 2 \end{cases}$$

$$L(\cdot) = x^2 \frac{d^2(\cdot)}{dx^2} + x\frac{d(\cdot)}{dx} + (\cdot)$$

$$B(\cdot) = (\cdot)$$