

Coloquio

Análisis Matemático IIIC (61.13)

- 1) Calcular la temperatura en el punto (1,1) con:

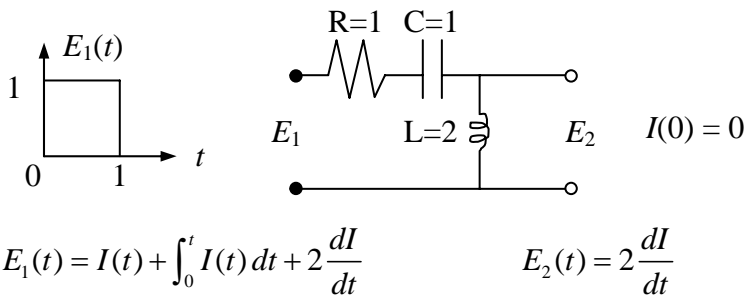
$$\nabla^2 u = 0, y > 0, x \in (0,1), u(x,0) = 1+x, u(0,y) = 1, \frac{\partial u}{\partial x}(1,y) = 0.$$

$$\left. \begin{array}{c} 1 \\ 0 \end{array} \right|_{1+x} \left. \begin{array}{c} 1 \\ 1 \end{array} \right| u_x = 0$$

- 2) Hallar la solución general de la ecuación diferencial: $x^2 y'' - 4xy' + 6y = x$

- 3) Hallar $f(t)$, $-\infty < t < \infty$, si $F(w) = \frac{1}{1+w^2}$.

- 4) Hallar $E_2(t)$ y graficarlo:



Respuestas

$$1) \quad u(x,y) = \sum_{n=0}^{\infty} \left(\frac{2(-1)^n}{\pi^2 (n + \frac{1}{2})^2} \sin(\pi(n + \frac{1}{2})x) e^{-\pi(n + \frac{1}{2})y} \right) + 1$$

$\Rightarrow u(1,1) \cong 1,000082 \quad (\text{mediante } S_5 + 1)$

$$2) \quad y(x) = Ax^3 + Bx^2 + \frac{1}{2}x$$

$$3) \quad f(t) = \frac{1}{2} e^{-|t|}$$

$$4) \quad E_2(t) = \cos\left(\frac{\sqrt{7}}{4}t\right)e^{-\frac{1}{4}t}H(t) - \cos\left(\frac{\sqrt{7}}{4}(t-1)\right)e^{-\frac{1}{4}(t-1)}H(t-1) - \frac{1}{\sqrt{7}}\sin\left(\frac{\sqrt{7}}{4}t\right)e^{-\frac{1}{4}t}H(t) + \dots$$

$$\dots + \frac{1}{\sqrt{7}}\sin\left(\frac{\sqrt{7}}{4}(t-1)\right)e^{-\frac{1}{4}(t-1)}H(t-1)$$

