



UNIVERSIDAD NACIONAL DE INGENIERÍA
FACULTAD DE CIENCIAS
ESCUELA PROFESIONAL DE MATEMÁTICA
Análisis de Modelamiento Numérico I

Ciclo 2020_01

Fecha: 09/09/2020

Profesores: Fidel Jara Huanca y Victor Huanca Sullca

Solucionario de la Practica Calificada No.6

Problema 1

DISCOS / $D_1(0,3) = \{\lambda / \underbrace{|\lambda - 0| \leq 3}_{|\lambda| \leq 3}\}$
 $D_1(0,3) = \{\lambda / |\lambda| \leq 3\}$
 $D_2(-10,2) = \{\lambda / |\lambda + 10| \leq 2\}$
 $D_3(4,2) = \{\lambda / |\lambda - 4| \leq 2\}$
} $\lambda \leq 6$

RADIO ESPECTRAL:
 $\rho(A) = \max\{|\lambda_1|, |\lambda_2|, |\lambda_3|\}$
 $\rho(A) \in [-12, 6]$

Problema 2

$$A = \begin{bmatrix} 4 & -1 & 1 \\ -1 & 3 & -2 \\ 1 & -2 & 3 \end{bmatrix}; \quad x_0 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

$$\bullet \quad y_1 = Ax_0 = \begin{pmatrix} 4 \\ -1 \\ 1 \end{pmatrix}; \quad c_1 = 4$$

$$\bullet \quad x_1 = \frac{y_1}{c_1} = \begin{pmatrix} 1/4 \\ -1/4 \\ 1/4 \end{pmatrix}, \quad x_2 = \frac{Ax_1}{c_2} = \begin{pmatrix} 1 \\ -0,5 \\ 0,5 \end{pmatrix}, \quad c_2 = 4,5$$

$$x_3 = \frac{Ax_2}{c_3} = \begin{pmatrix} 1 \\ -0,7 \\ 0,7 \end{pmatrix}; \quad c_3 = 5,0$$

$$\vdots$$

Valor propio DOMINANTE APROXIMADO: $\lambda_1 = 6$
 VECTOR PROPIO: $v_{\lambda_1} = \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$

Problema 3

Let $P_m(x)$ be the polynomial that passes through

$$(x_0, f(x_0)), \dots, (x_m, f(x_m)).$$

Then, the function

$$f(x) - P_m(x)$$

has $m + 1$ zeros at x_0, x_1, \dots, x_m . So,

$$f'(x) - P'_m(x)$$

has m zeros.

$$f''(x) - P''_m(x)$$

has $m - 1$ zeros, and so on.

$$f^{(m)}(x) - P^{(m)}_m(x)$$

has one zero. Denote that zero by ξ .

$$f^{(m)}(\xi) = P^{(m)}_m(\xi)$$

$P_m(x)$ is a polynomial of order $\leq m$. Therefore,

$$P^{(m)}_m(x) = m!f[x_0, \dots, x_m]$$

(Recall $f[x_0, \dots, x_m]$ is the leading coefficient.) We get

$$f^{(m)}(\xi) = P^{(m)}_m(\xi) = m!f[x_0, \dots, x_m].$$

Problema 4

Algoritmo 1

Determina las diferencias divididas de un grupo finito de datos

Algoritmo 2

Usando el algoritmo 2 determina el polinomio interpolador del grupo de datos

Problema 5

