ALEJANDRO SANTORUM VARELA TAREA 7

$$y_{n+3} - y_{n+2} = h\left(\frac{23}{12} f_{n+2} - \frac{4}{3} f_{n+1} + \frac{5}{12} f_n\right) \qquad \boxed{K=3}$$

- Primer polinomio característico:

$$p(\xi) = \sum_{j=0}^{K} \alpha_j \xi^j$$

En este caso $\alpha_0 = \alpha_1 = 0$, $\alpha_2 = -1$, $\alpha_3 = 1$

$$\Rightarrow p(\xi) = \xi^3 - \xi^2$$

- Segundo polinomio característico:

$$\sigma(\xi) = \sum_{j=0}^{K} \beta_j \xi^j$$

En este caso $\beta_0 = \frac{5}{12}$, $\beta_1 = \frac{-4}{3}$, $\beta_2 = \frac{23}{12}$, $\beta_3 = 0$

$$\Rightarrow \sigma(\xi) = \frac{23}{12}\xi^2 - \frac{4}{3}\xi + \frac{5}{12}$$

- Criterio de la raíz: $\xi^3 - \xi^2 = 0 \iff \xi^2(\xi - 1) = 0$ → $\xi = 0$ (doble), $\xi = 1$ (simple) ✓

$\Rightarrow$ Se cumple el criterio de la raíz.

- Orden de consistencia: MLM consistente de orden $p \geq 1 \iff$

$\iff C_q = \frac{1}{q!}\left[\sum_{j=0}^{K} \alpha_j j^q - q \sum_{j=0}^{K} \beta_j j^{q-1}\right] = 0 \quad \forall q = 0, 1, \dots, p$ y $C_{p+1} \neq 0$.

$\boxed{q=0}$ $1\left[1 - 1 - 0\right] = 0$ ✓

$\boxed{q=1}$ $1\left[-1.2 + 1.3 - 1.\left(\frac{5}{12} - \frac{4}{3} + \frac{23}{12}\right)\right] = 0$ ✓

$\boxed{q=2}$ $\frac{1}{2}\left[-1.2^2 + 1.3^2 - 2\left(\frac{-4}{3} + \frac{23}{12}.2\right)\right] = 0$ ✓

$\boxed{q=3}$ $\frac{1}{6}\left[-1.2^3 + 1.3^3 - 3\left(\frac{-4}{3} + \frac{23}{12}.2^2\right)\right] = 0$ ✓

$\boxed{q=4}$ $\frac{1}{24}\left[-1.2^4 + 1.3^4 - 4\left(\frac{-4}{3} + \frac{23}{12}.2^3\right)\right] = \frac{9}{24} = \frac{3}{8} \neq 0$

$\Rightarrow$ orden de consistencia igual a 3.