

Tarea 11

$$1. \frac{3x^3 - x^2 + x - 1}{(x^2 + 4)^2} = \frac{Ax + B}{x^2 + 4} + \frac{(x + D)}{(x^2 + 4)^2}$$

$$3x^3 - x^2 + x - 1 = Ax^3 + 4Ax + Bx^2 + 4B + Cx + D$$

$x^3 \rightarrow 3 = A$
 $x^2 \rightarrow -1 = B$
 $x \rightarrow 1 = 4A + C$
 $x^0 \rightarrow -1 = 4B + D$

$A = 3$
 $B = -1$
 $C = -11$
 $D = 3$

∴ La D. en f.p. es:

$$\frac{3x - 1}{x^2 + 4} + \frac{-11x + 3}{(x^2 + 4)^2}$$

$$2. \frac{-3x^3 + x^2 + x}{(x^2 + 1)^2} = \frac{Ax + B}{x^2 + 1} + \frac{(x + D)}{(x^2 + 1)^2}$$

$$-3x^3 + x^2 + x = Ax^3 + Ax + Bx^2 + B + Cx + D$$

$x^3 \rightarrow -3 = A$
 $x^2 \rightarrow 1 = B$
 $x \rightarrow 1 = A + C$
 $x^0 \rightarrow 0 = B + D$

$A = -3$
 $B = 1$
 $C = 4$
 $D = -1$

∴ La D. en f.p. es:

$$\frac{-3x + 1}{x^2 + 1} + \frac{4x - 1}{(x^2 + 1)^2}$$

$$3. \frac{11x + 3}{(x + 3)(x^2 + 7)} = \frac{A}{x + 3} + \frac{Bx + C}{x^2 + 7}$$

$$11x + 3 = Ax^2 + A + Bx^2 + 3Bx + Cx + 3C$$

$x^2 \rightarrow 0 = A + B$ ①
 $x \rightarrow 11 = 3B + C$ ②
 $x^0 \rightarrow 3 = A + 3C$ ③

$A = -3$
 $B = 3$
 $C = 2$

∴ La D. en f.p. es:

$$\frac{-3}{x + 3} + \frac{3x + 2}{x^2 + 7}$$

$0 = -3A - 3B$
 $11 = -3A + C$ ④
 $-33 = 9A - 3C$
 $-30 = 10A = -3$

$$4. \frac{-3x^3 - 2x^2}{(x^2+3)^2} = \frac{Ax+B}{x^2+3} + \frac{(x+D)}{(x^2+3)^2}$$

$$-3x^3 - 2x^2 = Ax^3 + 3Ax + Bx^2 + 3B + (x+D)$$

$$X^3 \rightarrow -3 = A \quad A = -3 \quad \text{La D. en f.p. es:}$$

$$X^2 \rightarrow -2 = B \quad B = -2 \quad \frac{-3x-2}{x^2+3} + \frac{x+6}{(x^2+3)^2}$$

$$X \rightarrow 0 = 3A + C \quad C = 9$$

$$X^0 \rightarrow 0 = 3B + D \quad D = 6$$

$$5. \frac{5x^2+4x+4}{x^3+x} = \frac{A}{x} + \frac{Bx+C}{x^2+1}$$

$$5x^2+4x+4 = Ax^2 + A + Bx^2 + Cx$$

$$X^2 \rightarrow 5 = A+B \quad A = 4 \quad \text{La D. en f.p. es:}$$

$$X \rightarrow 4 = C \quad B = 1 \quad \frac{4}{x} + \frac{x+4}{x^2+1}$$

$$X^0 \rightarrow 4 = A \quad C = 4$$

$$6. \frac{-4}{x^3+4x} = \frac{-4}{x(x^2+4)} = \frac{A}{x} + \frac{Bx+C}{x^2+4}$$

$$-4 = Ax^2 + 4A + Bx^2 + Cx \quad \text{La D. en f.p. es:}$$

$$X^2 \rightarrow 0 = A+B \quad A = -1 \quad \frac{-1}{x} + \frac{x}{x^2+4}$$

$$X \rightarrow 0 = C \quad B = 1$$

$$X^0 \rightarrow -4 = 4A \quad C = 0$$

$$7. \frac{-15x+3}{(x+3)(x^2+3)} = \frac{A}{x+3} + \frac{Bx+C}{x^2+3}$$

$$-15x+3 = Ax^2 + 3A + Bx^2 + 3Bx + Cx + 3C$$

$$X^2 \rightarrow 0 = A+B \quad \textcircled{1} \quad X-3 = 0 = -3A - 3B$$

$$X \rightarrow -15 = 3B+C \quad \textcircled{2} \quad -15 = -3A + C$$

$$X^0 \rightarrow 3 = 3A+3C \quad \textcircled{3} \quad -12 = 4C$$

La D. en f.p. es:

$$\frac{4}{x+3} + \frac{-4x-3}{x^2+3}$$

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$$8. \frac{-x^3 + x^2 + x - 7}{(x^2 + 2)^2} = \frac{Ax + B}{x^2 + 2} + \frac{C(x + D)}{(x^2 + 2)^2}$$

$$-x^3 + x^2 + x - 7 = Ax^3 + 2Ax + Bx^2 + 2B + Cx + D$$

$$\begin{aligned} x^3 \rightarrow -1 &= A & A &= -1 \\ x^2 \rightarrow 1 &= B & B &= 1 \\ x \rightarrow 1 &= 2A + C & C &= 3 \\ x^0 \rightarrow -7 &= 2B + D & D &= -3 \end{aligned}$$

La D. en f.p. es:

$$\frac{-x + 1}{x^2 + 2} + \frac{3x - 3}{(x^2 + 2)^2}$$

$$9. \frac{3x^3 - x^2 + x}{(x^2 + 4)^2} = \frac{Ax + B}{x^2 + 4} + \frac{C(x + D)}{(x^2 + 4)^2}$$

$$3x^3 - x^2 + x = Ax^3 + 4Ax + Bx^2 + 4B + Cx + D$$

$$\begin{aligned} x^3 \rightarrow 3 &= A & A &= 3 \\ x^2 \rightarrow -1 &= B & B &= -1 \\ x \rightarrow 1 &= 4A + C & C &= -11 \\ x^0 \rightarrow 0 &= 4B + D & D &= 4 \end{aligned}$$

La D. en f.p. es:

$$10. \frac{5x^2 + 7x + 3}{x^3 + 3x} = \frac{A}{x} + \frac{Bx + C}{x^2 + 3}$$

$$5x^2 + 7x + 3 = Ax^2 + 3A + Bx^2 + Cx$$

$$\begin{aligned} x^2 \rightarrow 5 &= A + B & A &= 1 \\ x \rightarrow 7 &= C & B &= 4 \\ x^0 \rightarrow 3 &= 3A & C &= 7 \end{aligned}$$

La D. en f.p. es:

$$\frac{1}{x} + \frac{4x + 7}{x^2 + 3}$$

$$11. \frac{2x^3 + x^2}{(x^2 + 1)^2} = \frac{Ax + B}{x^2 + 1} + \frac{C(x + D)}{(x^2 + 1)^2}$$

$$2x^3 + x^2 = Ax^3 + Bx^2 + Ax + B + Cx + D$$

$$\begin{aligned} x^3 \rightarrow 2 &= A & A &= 2 \\ x^2 \rightarrow 1 &= B & B &= 1 \\ x \rightarrow 0 &= A + C & C &= -2 \\ x^0 \rightarrow 0 &= B + D & D &= -1 \end{aligned}$$

La D. en f.p. es:

$$\frac{2x + 1}{x^2 + 1} + \frac{-2x - 1}{(x^2 + 1)^2}$$

$$12. \frac{-9}{(x+1)(x^2+8)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+8}$$

$$-9 = A(x^2+8) + (Bx+C)(x+1)$$

$$\begin{aligned} x^2 \rightarrow 0 &= A + B & 0 &= A - C \\ x \rightarrow 0 &= B + C & 0 &= 9A \\ x^0 \rightarrow -9 &= 8A + C \end{aligned}$$

La D. en f.p. es:

$$\frac{-7}{x+1} + \frac{x-7}{x^2+8}$$

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