

$$\frac{x}{(x^2+1)(x^2-4)} = \frac{x}{\underbrace{(x+i)(x-i)}_{x^2+1}(x+2)(x-2)}$$

$$= \frac{a}{x+i} + \frac{b}{x-i} + \frac{c}{x+2} + \frac{d}{x-2}$$

$$\Rightarrow a = \frac{-i}{-2i(-i+2)(-i-2)} = \frac{1}{2} \cdot \frac{1}{i^2-4}$$

$$= -\frac{1}{10}$$

$$\Rightarrow b = \frac{i}{2i(i+2)(i-2)} = \frac{1}{2 \cdot (i^2-4)} = -\frac{1}{10}$$

$$\Rightarrow c = \frac{-2}{5 \cdot (-4)} = \frac{1}{10}$$

$$\Rightarrow d = \frac{2}{5 \cdot 4} = \frac{1}{10}$$

$$\text{Vu que } -\frac{1}{10} \left(\frac{1}{x+i} + \frac{1}{x-i} \right)$$

$$= -\frac{1}{10} \cdot \frac{2x}{x^2+1}, \text{ on peut écrire}$$

$$\int \frac{x}{(x^2+1)(x^2-4)} dx = -\frac{1}{10} \int \frac{2x}{x^2+1} dx$$

$$+ \frac{1}{10} \ln|x+2| + \frac{1}{10} \ln|x-2| + C$$

$$\text{Calculons: } \int \frac{2x}{x^2+1} dx = \ln|x^2+1|$$

$$\Rightarrow \int \frac{x}{(x^2+1)(x^2-4)} dx = \frac{1}{10} \cdot \ln \left| \frac{x^2-4}{x^2+1} \right| + C$$