$$\int \frac{1}{x^2(x^2+2)}\,dx =$$

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$$= \frac{1}{2}\int \frac{2}{x^2(x^2+2)}\,dx =$$

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

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

$$= \frac{1}{2}\int \frac{1}{x^2} - \frac{1}{x^2+2}\,dx =$$

$$= \frac{1}{2}\int x^{-2}\,dx - \frac{1}{2}\int \frac{1}{x^2+2}\,dx =$$

$$= \frac{1}{2}\,\frac{1}{-2+1}\,x^{-2+1} - \frac{1}{2}\int \frac{1}{2\left(\frac{1}{2}x^2+1\right)}\,dx =$$

$$= \frac{1}{2}\cdot\frac{1}{-1}\,x^{-1} - \frac{1}{2}\int \frac{1}{2}\cdot\frac{1}{\frac{1}{2}x^2+1}\,dx =$$

$$= -\frac{1}{2}\cdot\frac{1}{x} - \frac{1}{4}\int \frac{1}{\left(\frac{x}{\sqrt{2}}\right)^2+1}\,dx =$$

SOSTITUZIONE: $\frac{x}{\sqrt{2}} = z \rightarrow x = \sqrt{2}\,z \rightarrow$

$\rightarrow x' = \frac{dx}{dz} = \sqrt{2} \rightarrow dx = \sqrt{2}\,dz$

$$= -\frac{1}{2x} - \frac{1}{4}\int \frac{1}{z^2+1}\sqrt{2}\,dz =$$

$$= -\frac{1}{2x} - \frac{\sqrt{2}}{4}\operatorname{arctg} z + k = \boxed{-\frac{1}{2x} - \frac{\sqrt{2}}{4}\operatorname{arctg}\frac{x}{\sqrt{2}} + k}$$

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