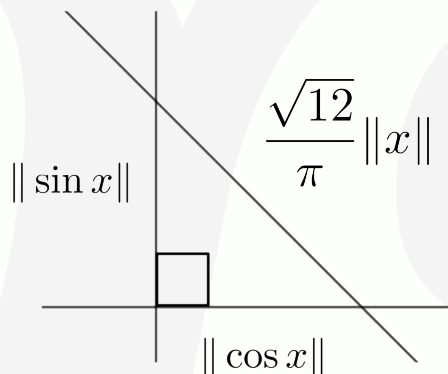


Seja  $\langle f, g \rangle = \int_{-\pi/2}^{\pi/2} f(x) \cdot g(x) \, dx$ , mostre que



Demonstração:

$$\| \cos x \| = \sqrt{\int_{-\pi/2}^{\pi/2} \cos^2 x \, dx} = \sqrt{\frac{\pi}{2}}$$

$$\| \sin x \| = \sqrt{\int_{-\pi/2}^{\pi/2} \sin^2 x \, dx} = \sqrt{\frac{\pi}{2}}$$

$$\| x \| = \sqrt{\int_{-\pi/2}^{\pi/2} x^2 \, dx} = \sqrt{\frac{\pi^3}{12}}$$

$$\text{Logo, } \|\sin x\|^2 + \|\cos x\|^2 = \left( \frac{\sqrt{12}}{\pi} \|x\| \right)^2.$$

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