$$\int_0^{4\pi} \frac{1}{\sin^2 x + 2\cos^2 x}\,dx \qquad f(\omega)\cdot\omega'$$

$$t = \tan x = \omega(x) \qquad x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

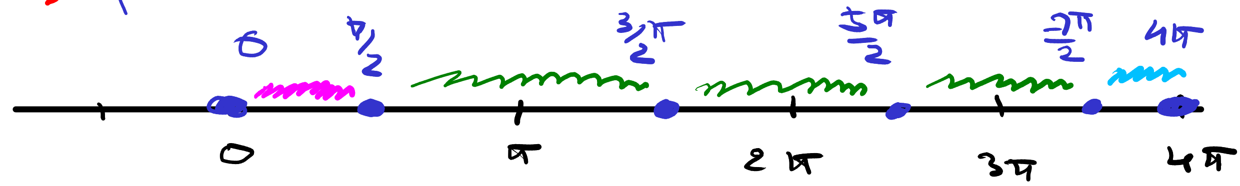
$$dt = \frac{1}{\cos^2 x}\,dx \qquad \omega'(x) = \frac{1}{\cos^2 x} > 0 \quad (\text{na } (\alpha,\beta))$$

$$\int \overbrace{\frac{1}{\frac{t^2}{1+t^2} + 2\frac{1}{1+t^2}}\,\frac{1}{1+t^2}}^{f(t)}\,dt = \int \frac{1}{t^2+2}\,dt = \int \frac{1}{2\left(\left(\frac{t}{\sqrt2}\right)^2+1\right)}\,dt$$

$$= \frac{1}{2}\sqrt2 \arctan\frac{t}{\sqrt2} + c$$

~~x: 0, 4π; t = tan x: 0, 0~~

~~$\int_0^0 \frac{1}{t^2+2}\,dt = 0$~~



$$\int_0^{4\pi} \frac{1}{\sin^2 x + 2\cos^2 x} = \int_0^{\pi/2} + \int_{\pi/2}^{3\pi/2} + \int_{3\pi/2}^{5\pi/2} + \int_{5\pi/2}^{7\pi/2} + \int_{7\pi/2}^{4\pi}$$

$(\alpha,\beta) = (0, \pi/2)$ $\qquad \tan(0,\pi/2) = (0,\infty) = (a,b)$

$(\pi/2, 3\pi/2)$ $\qquad \tan(\pi/2, 3\pi/2) = (-\infty,\infty) = (a,b)$

$\vdots$

$(7\pi/2, 4\pi)$ $\qquad \tan(7\pi/2, 4\pi) = (-\infty, 0) = (a,b)$

$$\rightarrow \int_0^{\infty} \frac{1}{2+t^2}\,dt = \left[\frac{\sqrt2}{2}\arctan\frac{t}{\sqrt2}\right]_0^{\infty} = \frac{\sqrt2}{2}\frac{\pi}{2}$$

$$\rightarrow \int_{-\infty}^{\infty} = \left[\frac{\sqrt2}{2}\arctan\frac{t}{\sqrt2}\right]_{-\infty}^{\infty} = \frac{\sqrt2}{2}\left(\frac{\pi}{2} - -\frac{\pi}{2}\right)$$

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$$\rightarrow \int_{-\infty}^{0} = \left[\frac{\sqrt2}{2}\arctan\frac{t}{\sqrt2}\right]_{-\infty}^{0} = -\frac{\sqrt2}{2}\left(-\frac{\pi}{2}\right)$$

Celzem:

$$\int_0^{4\pi} = \frac{\sqrt{2}}{2}\left(\frac{\pi}{2} + 3\pi + \frac{\pi}{2}\right) = 2\sqrt{2}\,\pi$$

$$\int_{-1}^{5} e^{3x+1}\,dx = \left[\frac{1}{3}e^{3x+1}\right]_{-1}^{5}$$

$$\int_a^b f+g = \int_a^b f + \int_a^b g = \infty - \infty$$

F

$$= \left[F + G\right]_a^b$$

$$\int e^{3x+1}\,dx = \int \frac{1}{3} e^y\,dy \overset{c}{=} \frac{1}{3} e^y$$

$y = 3x+1$

$dy = 3dx$

$$= \frac{1}{3} e^{3x+1}.$$

$$\left[\frac{1}{3}e^y\right]_{\dots}^{\dots}$$