$$F(z) = \frac{1}{(z-2)(z-1)^2} \quad 0 \leq |z-1| \leq 1$$

$$\sum_{n=0}^{\infty} z^n = \frac{1}{1-z} \quad 0 \leq |z| \leq 1$$

$$\sum_{n=0}^{\infty} (z-1)^n = \frac{1}{1-(z-1)} = \frac{1}{1-z+1} = \frac{1}{2-z}$$

$$\sum_{n=0}^{\infty} (-1)(z-1)^n = \frac{1}{z-2} \left(\frac{1}{(z-1)^2} \right)$$

$$= \frac{1}{(z-1)^2} \sum_{n=0}^{\infty} (-1)(z-1)^n = \sum_{n=0}^{\infty} \frac{(-1)(z-1)^n}{(z-1)^2}$$

$$= \sum_{n=0}^{\infty} (-1)(z-1)^{n-2}$$

Por teorema de Cauchy evalue la integral a lo largo del contorno

$$\int \frac{\cos z}{(z-1)^2(z^2+9)}\,dz \qquad |z-1|=1$$

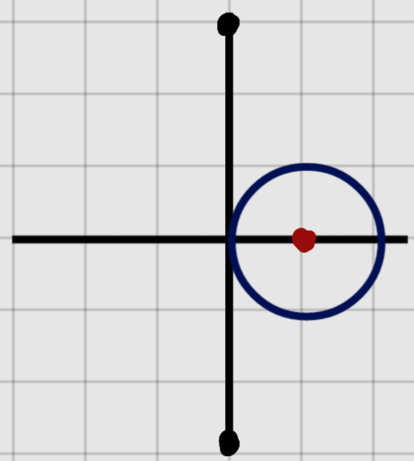
$(z-1)^2=0$

$z=1$

$z^2+9=0$

$z^2=-9$

$z=\sqrt{-9}=\pm 3i$



$$\int \frac{\frac{\cos z}{(z^2+9)}}{(z-1)^2}$$

$$\frac{d}{dz}\left(\frac{\cos z}{z^2+9}\right)=\frac{(z^2+9)(-\operatorname{sen} z)-\cos z\, 2z}{(z^2+9)^2}$$

$$=\lim_{z\to 1}\left(\frac{(1^2+9)(-\operatorname{sen}(1))-\cos(1)\,2}{(1^2+9)^2}\right)$$

$$= \frac{(1+9)(-\operatorname{sen}(1) - 2\cos(1))}{100}$$

$$= \frac{-10\operatorname{sen}(1) - 2\cos(1)}{100}$$

$$= \frac{-\operatorname{sen}(1)}{10} - \frac{\cos(1)}{50}$$

$$= 2\pi\left(\frac{-\operatorname{sen}(1)}{10} - \frac{\cos(1)}{50}\right)$$

$$= -2\pi i\left(\frac{\operatorname{sen}(1)}{10} + \frac{\cos(1)}{50}\right)$$

$$F(s) = \frac{1}{(1-is)^2}$$ Inversa

$$f(t) = \frac{1}{2\pi} \int_{-\infty}^{\infty} \frac{e^{ist}}{(1-is)^2}$$ $s = i$

$$\lim_{s \to i} \frac{d}{ds}\left(\frac{e^{ist}}{(1-is)^2} \right) = \frac{(s-1)^2 e^{ist}}{(1-is)^2}$$

$$\lim_{s \to i} \left(\frac{\cancel{(i-i)^2} e^{iit}}{\cancel{(1-ii)^2}} \right) = \frac{d}{ds}\left(e^{ist} \right) = \frac{\cancel{2\pi} i}{\cancel{2\pi}}$$

$$it\, e^{ist} = it\, e^{iit} = it\, e^{-t}$$

$$= t e^{-t}$$

$$w^{1/6} = \frac{16i}{1+i}$$

$$\frac{16i(1-i)}{(1+i)(1-i)} = \frac{16i - 16i^2}{1+i^2} = \frac{16i+16}{1+1}$$

$$= \frac{16i+16}{2} = (8+8i)^{1/6} =$$

$$|w| = \sqrt{(8)^2+(8)^2} = \sqrt{64+64} = \sqrt{128}$$

$$\arg = \arctan\left(\frac{8}{8}\right) = \arctan(1) = \pi/4$$

$$= \sqrt{128}^{1/6}\left[\cos\left(\frac{\pi}{24}+\frac{k\pi}{3}\right) + i\,\mathrm{sen}\left(\frac{\pi}{24}+\frac{k\pi}{3}\right)\right]$$