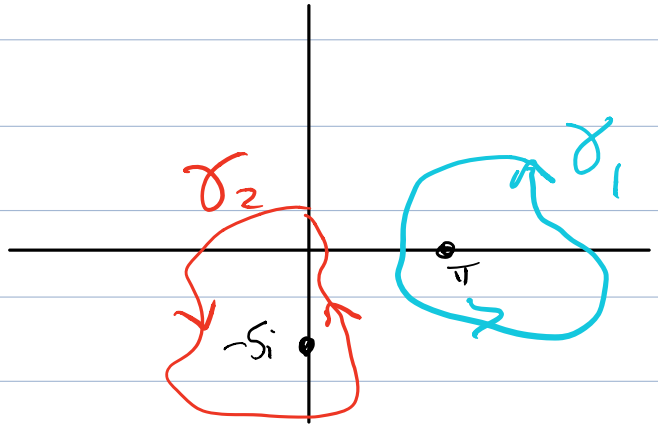
Evaluate

$$\oint \frac{\cos(z)}{(z-\pi)(z+5i)}\,dz$$

along $\gamma_1 + \gamma_2$



On γ_1, use

$$2\pi i \operatorname{Res}\left[\frac{\cos(z)}{(z-\pi)(z+5i)}\,;\,\pi\right]$$

$$= 2\pi i \lim_{z \to \pi} (z-\pi) f(z)$$

$$= 2\pi i \frac{\cos(\pi)}{\pi + 5i}$$

$$2\pi i \operatorname{Res}\left[\frac{\cos(z)}{(z-\pi)(z+5i)}\,;\,-5i\right] = \frac{2\pi i \cos(-5i)}{-5i-\pi}$$