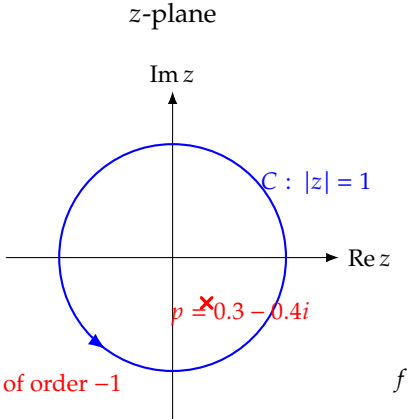


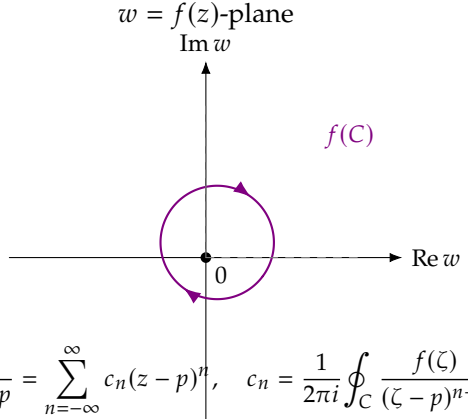


$$f(z) = \frac{1}{z-p}, \quad \operatorname{ord}_p f = \operatorname{Res}\left(\frac{df}{f}, p\right) = \frac{1}{2\pi i}\oint_C \frac{-1}{z-p} = -1.$$

$$f(z) = \frac{1}{z-p} = \sum_{n=-\infty}^{\infty} c_n (z-p)^n, \quad c_n = \frac{1}{2\pi i}\oint_C \frac{f(\zeta)}{(\zeta-p)^{n+1}}\, d\zeta.$$

For $f(z) = 1/(z-p)$: $c_{-1} = \frac{1}{2\pi i}\oint_C f(\zeta)\, d\zeta = 1, \quad c_n = 0 \ (n \neq -1).$

$$\operatorname{wind}\big(f(C), 0\big) = -1 \ \Rightarrow \ \oint_C \frac{f'(z)}{f(z)}\, dz = -2\pi i.$$