Geometric Series

$$\frac{1}{1-r} = 1 + r + r^2 + r^3 + \dots$$

Converges for $|r| < 1$

$$\frac{2}{3-4x} = 2\left(\frac{1}{3-4x}\right)$$

$$= \frac{2}{3}\left(\frac{1}{1-\frac{4}{3}x}\right) \qquad r = \frac{4}{3}x$$

$$= \frac{2}{3}\left(1 + \frac{4}{3}x + \frac{16}{9}x^2 + \frac{64}{27}x^3 + \dots\dots\right)$$

Converges For

$$\left|\frac{4}{3}x\right| < 1$$

$$\left|\frac{4}{3}\right||x| < 1$$

$$\frac{4}{3}|x| < 1$$

$$|x| < \frac{3}{4}$$

$$\frac{2}{3}\left(1+\frac{4}{3}x+\frac{16}{9}x^2+\frac{64}{27}x^3+\cdots\right)$$

$$\frac{2}{3}+\frac{8}{9}x+\frac{32}{27}x^2+\frac{128}{81}x^3+\cdots$$

$$3-4x\,\overline{\big)\,2+0x+0x^2+0x^3}$$

$$-\left(2-\frac{8}{3}x\right)$$

$$\frac{8}{3}x$$

$$-\left(\frac{8}{3}x-\frac{32}{9}x^2\right)$$

$$\frac{32}{9}x^2$$

$$-($$

Power Series

$a_0 + a_1 x + a_2 x^2 + \dots \qquad (1)$

1. For what values of x does (1) converge?
2. Where it converges, does it represent a familiar function?

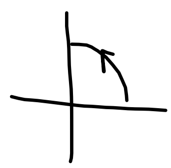
$$e^x = 1 + x + \frac{1}{2}x^2 + \frac{1}{3!}x^3 + \frac{1}{4!}x^4 + \dots$$

Exam 1 here, 1/30

bring def + thm sheets

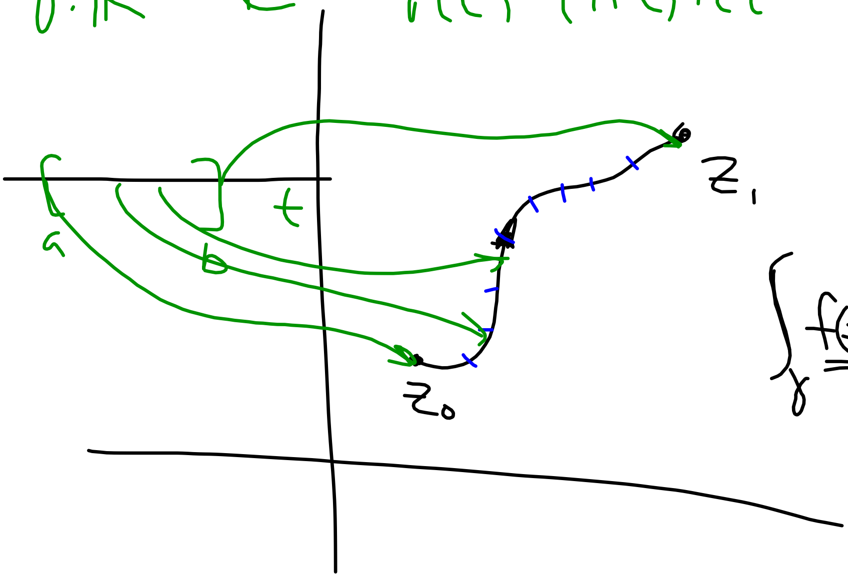
Office 2-3:30 Wed
9-12 Thurs

1. Complex # manipulations
2. Differentiation (CR eqns)
3. Complex exponential
4. ★ Integration → parametrizion of contour
5. Regions
6. Topology (boundary points, acc points, etc.)



$\gamma : \mathbb{R} \to \mathbb{C}$ $\quad \gamma(t) = (1+t) + ti$

$f(z)$



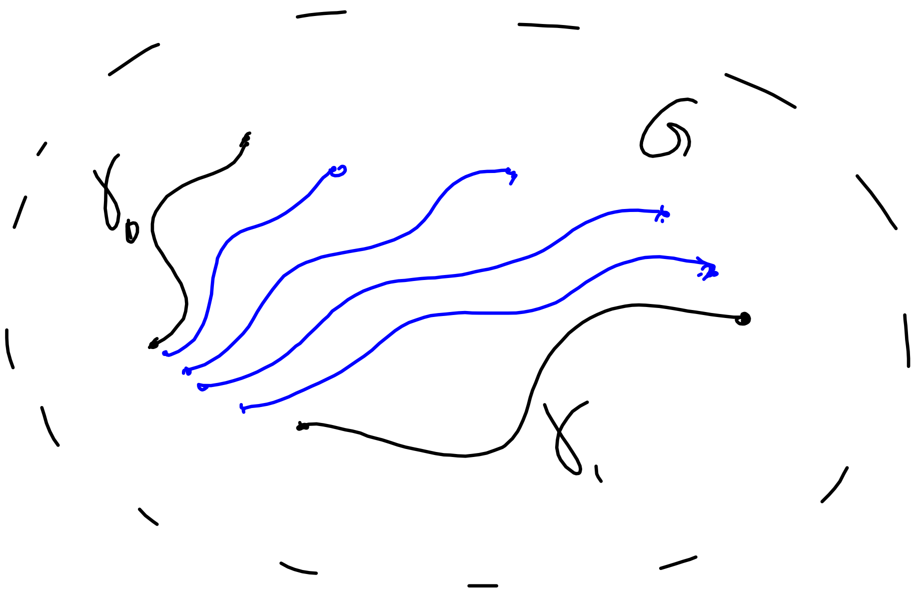
$$\int_\gamma f(z)\,dz$$

$\gamma_1(t)$

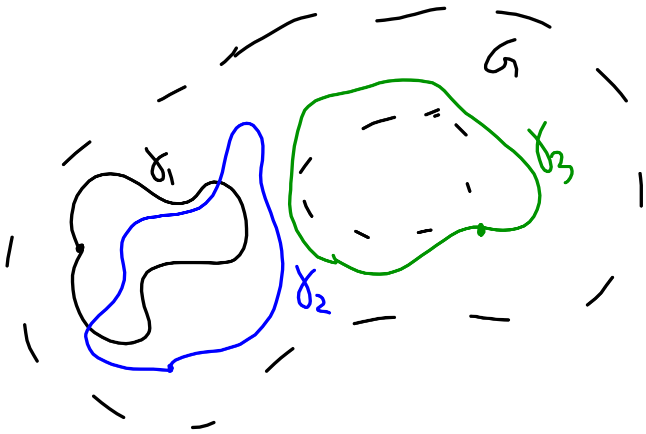
$\gamma_2(s)$

$$\int_{-\gamma} f = -\int_\gamma f$$

$$\int_{\gamma_1\gamma_2} f = \int_{\gamma_1} f + \int_{\gamma_2} f$$



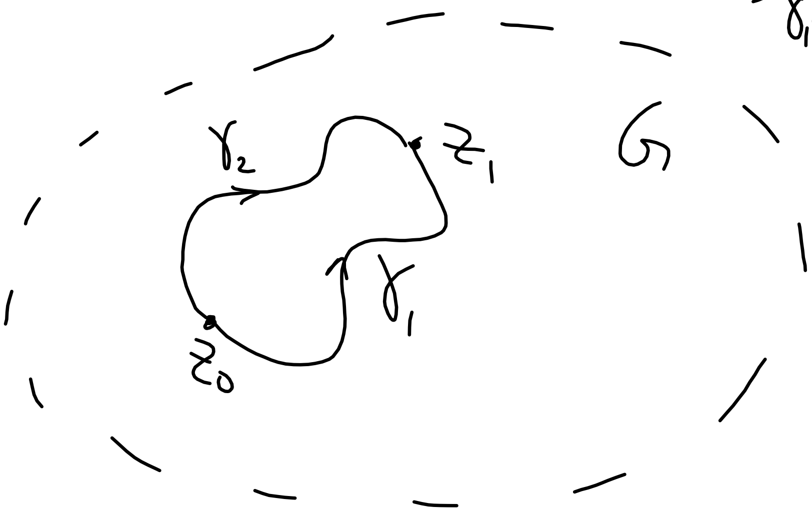
$$\gamma_0 \sim_G \gamma_1$$



γ_3 is not G-homotopic to γ_1 and γ_2

$$\gamma_1 \sim_G \gamma_2$$

f holomorphic $\int_{\gamma_1(-\gamma_2)} f = 0$



$$\int_{\gamma_1(-\gamma_2)} f = \int_{\gamma_1} f + \int_{-\gamma_2} f = \int_{\gamma_1} f - \int_{\gamma_2} f$$

$|z|<$