

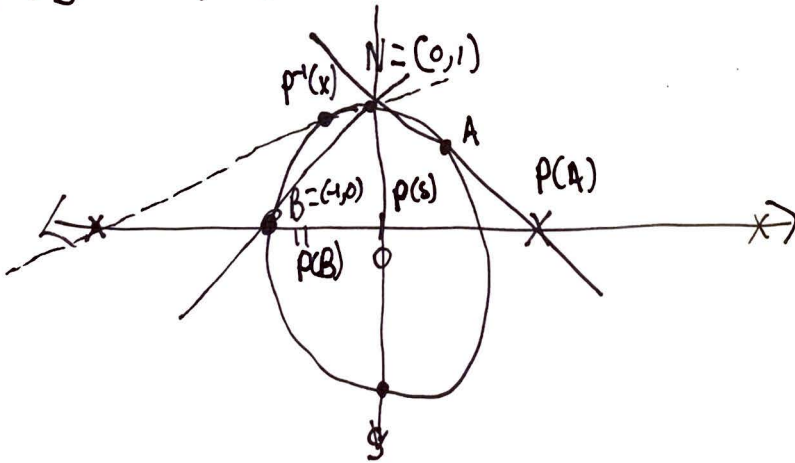
Stereographic Projection

Division by zero problem.

$$\text{Def: } S^1 = \{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 1\}$$

$$S^2 = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 = 1\}$$

$$P: S^1 \longrightarrow \mathbb{R} \cup \{\infty\}$$

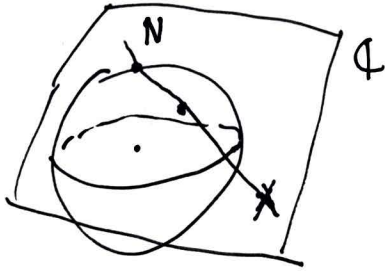


$$P(x, y) = \frac{x}{1-y} \quad \text{if } (x, y) \neq (0, 1)$$

$$P(0, 1) = \infty$$

$$\frac{1}{x} = \infty$$

$$P: S^2 \rightarrow \mathbb{C} \cup \{\infty\}$$



$$P(x, y, z) = (?)$$

Mobius transformations:

$$Tz = \frac{az + b}{cz + d} \quad \text{with } ad - bc \neq 0$$

$$T\left(-\frac{d}{c}\right) = \frac{a\left(-\frac{d}{c}\right) + b}{c\left(-\frac{d}{c}\right) + d} = \infty$$
