LaTeX for GHP Presentation

Edwin Trejo

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1 Introduction

Imaginary numbers are multiples of the imaginary unit, i, defined as:

$$\sqrt{-1} = i$$

Combining an imaginary number with a real number gives a complex number, which has the form:

$$z = x + iy$$

Where i is the imaginary unit, and x and y are real numbers

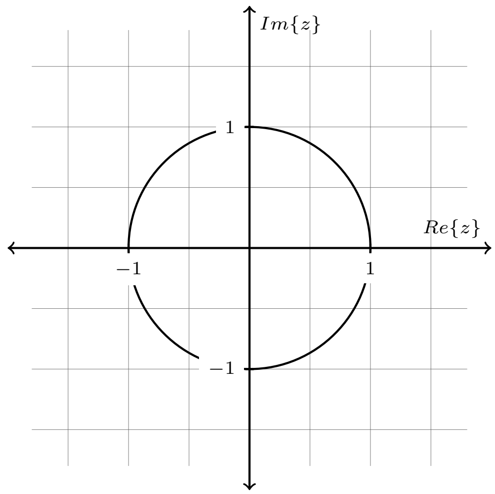
$$Re(Z) = x \qquad Im(Z) = y$$

A complex number can be graphed on the complex plane by replacing the x- and y- axes of the cartesian plane with the real and imaginary axes

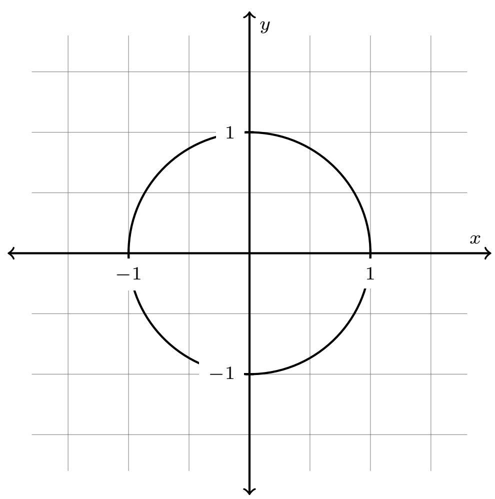
$$(x, y) \rightleftharpoons z = x + iy$$

$$C(t) = (cos(t), sin(t)) \rightleftharpoons C(t) = cos(t) + isin(t)$$

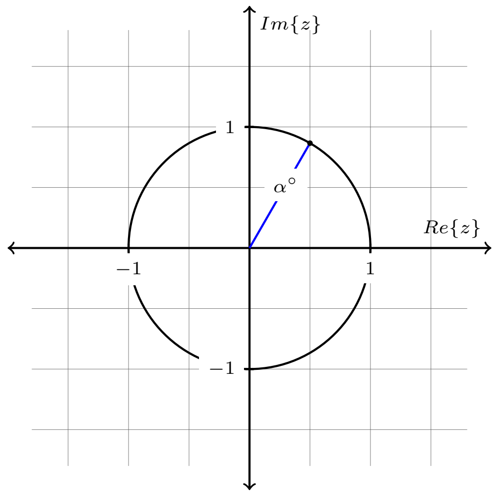
$$C(t) = cos(t) + isin(t)$$



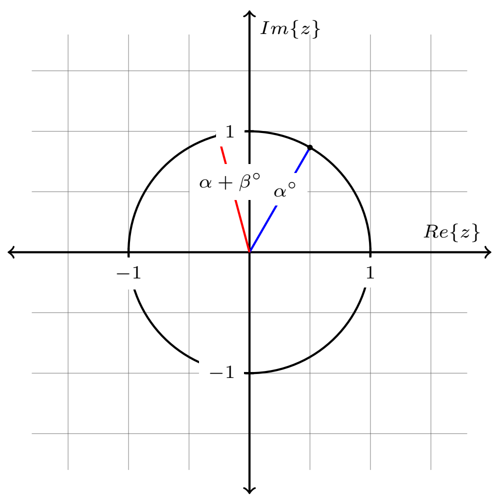
$$C(t) = (cos(t), sin(t))$$



$$e^{i(\alpha)} = cos(\alpha) + isin(\alpha)$$



$$e^{i(\alpha+\beta)} = cos(\alpha+\beta) + isin(\alpha+\beta)$$



$$f(t) = sin(t)$$

$$f'(t) = cos(t)$$

$$f(t) = sin(t)$$
$$f'(t) = cos(t)$$
$$f''(t) = -sin(t)$$
$$f'''(t) = -cos(t)$$

$$f^4(t) = ?$$

$$f^4(t) = sin(t)$$

$$f(t) = \sum_{n=0}^{\infty} \frac{f^{(n)}(0) * t^n}{n!}$$

$$sin(t) = \sum_{n=0}^{\infty} \frac{(sin(0))^{(n)} * t^n}{n!}$$

$$\sum_{n=0}^{\infty} \frac{(sin(0))^{(n)} * t^n}{n!} = sin(0) + cos(0)t + \frac{-sin(0)t^2}{2!} + \frac{-cos(0)t^3}{3!} - +...$$

$$sin(t) = 0 + t - 0 - \frac{t^3}{3!} + ...$$

$$sin(t) = t - \frac{t^3}{3!} + \frac{t^5}{5!} - \frac{t^7}{7!} + ...$$

$$cos(t) = 1 - \frac{t^2}{2!} + \frac{t^4}{4!} - \frac{t^6}{6!} + ...$$

$$C(t) = (1 - \frac{t^2}{2!} + \frac{t^4}{4!} - +...) + i(t - \frac{t^3}{3!} + \frac{t^5}{5!} - +...)$$

$$C(t) = (1 + \frac{(it)^2}{2!} + \frac{(it)^4}{4!} + ...) + i(t + \frac{i^2t^3}{3!} + \frac{i^4t^5}{5!} + ...)$$

$$C(t) = (1 + \frac{(it)^2}{2!} + \frac{(it)^4}{4!} + ...) + (it + \frac{(it)^3}{3!} + \frac{(it)^5}{5!} + ...)$$

$$C(t) = 1 + it + \frac{(it)^2}{2!} + \frac{(it)^3}{3!} + \frac{(it)^4}{4!} + \frac{(it)^5}{5!} + ...$$

$$f(t) = e^t$$

$$f'(t) = e^t$$

$$f^{(n)}(t) = e^t$$

$$e^t = \sum_{n=0}^{\infty} \frac{[e^0]^{(n)} * t^n}{n!}$$

$$e^t = e^0 + e^0 t + \frac{e^0t^2}{2!} + \frac{e^0t^3}{3!} + ...$$

$$e^t = 1 + t + \frac{t^2}{2!} + \frac{t^3}{3!} + \frac{t^4}{4!} + \frac{t^5}{5!} + ...$$

$$e^{it} = 1 + it + \frac{(it)^2}{2!} + \frac{(it)^3}{3!} + \frac{(it)^4}{4!} + \frac{(it)^5}{5!} + ...$$

$$e^{it} = C(t)$$

$$e^{it} = (1 - \frac{t^2}{2!} + \frac{t^4}{4!} - +...) + i(t - \frac{t^3}{3!} + \frac{t^5}{5!} - +...)$$

$$e^{it} = cos(t) + isin(t)$$

$$e^{i\alpha} = cos(\alpha) + isin(\alpha)$$

$$e^{i(\alpha+\beta)} = cos(\alpha+\beta) + isin(\alpha+\beta)$$

$$e^{i(\alpha+\beta)}$$

$$e^{i\alpha+i\beta}$$

$$e^{i\alpha} * e^{i\beta}$$