

First Year Mathematics tutoring for Natural Sciences
Week 5: Further introduction to the Complex Space

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- 1 Foundations
- 2 Complex space as \mathbb{R}^2
- 3 Something else for the class
- 4 Remainder of the class

Reading List or Recap

1 Wikipedia or other relevant key-word searches:

- Euclidean distance
- Normed vector space
- Isometry
- Root of unity

2 Figure 21 of the lecture note:

Figure 21 gives a geometrical interpretation of multiplication, as described by (70). The special case of multiplication by i corresponds simply to rotation by 90° anti-clockwise. Taking the complex conjugate of z corresponds to reflection in the x axis.

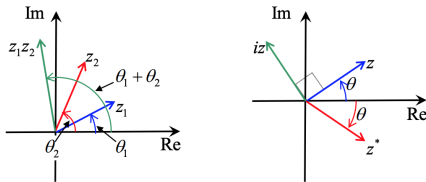


Figure 21: Argand diagram showing multiplication (left) and complex conjugates (right).

Complex space as \mathbb{R}^2

$$(\mathbb{C}, |\cdot|) \cong (\mathbb{R}^2, \|\cdot\|_2) \quad (1)$$

- The idea of $(\mathbb{C}, |\cdot|)$ and $(\mathbb{R}^n, \|\cdot\|_n)$
- The idea of isometric isomorphism and the beauty about it
- Sidetrack (pure entertainment, not covered in class): Even more fun thing about its application to Economics:

You probably don't wanna click here if you wish to skip this entertainment, which is not necessarily that fun.

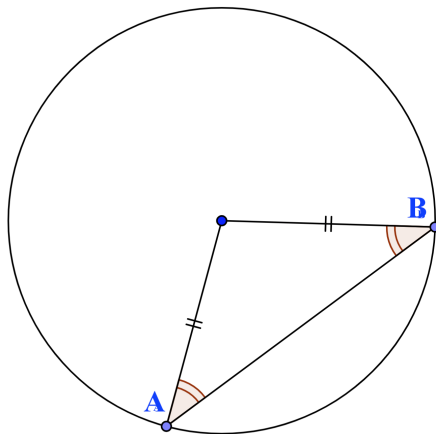


Figure: Isosceles triangle in a circle. Courtesy: GeoGebra

Extension: formula for the distance AB.

Remainder of the class

- ① Warm Up: Jack to demonstrate F19.
- ② Quick points regarding F9 and F17.
- ③ Main Teaching Point: F16