



## COMPLEX PLANE

### Why

We are regularly thinking of  $\mathbf{C}$  as plane.

### Definition

Since  $\mathbf{C} = \mathbf{R}^2$ , we can identify elements of  $\mathbf{C}$  with points in the plane (as we did in Real Plane). In this case, if  $z = x + iy \in \mathbf{C}$  (i.e,  $z = (x, y) \in \mathbf{R}^2$ ), we can visualize this identification in the following figure.

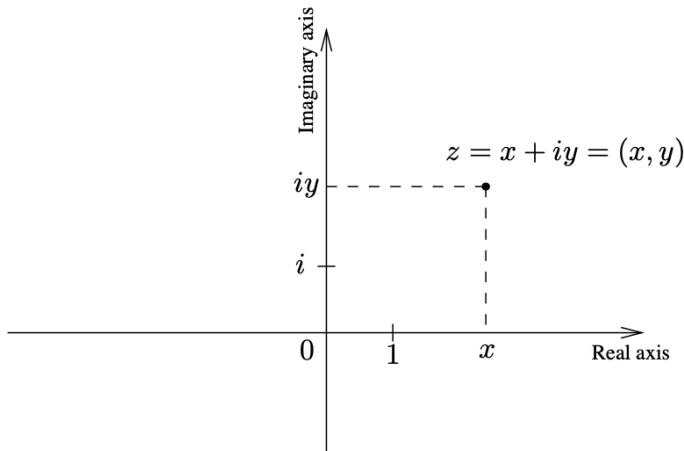


Figure 1: The complex plane

We can identify the origin with the complex number  $(0, 0) = 0 \in \mathbf{C}$ . For this reason we call  $0 \in \mathbf{C}$  the *complex origin*. Likewise, the imaginary number  $(0, 1) = i \in \mathbf{C}$  corresponds to  $(0, 1)$ . Clearly, the horizontal axis corresponds to the purely real numbers and the vertical axis corresponds to the purely imaginary numbers. For

these reasons, we refer to these axes as the *real axis* and *imaginary axis*, respectively. We refer to Figure 1 as the *complex plane* (or *Argand diagram*).



