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PHY382 Lab Report
Practical: 1 Registration No.: 11912610 Section: G2903

Aim

To calculate square root of a complex number using SciLAB

Methods

We use the `complex()` function to declare a complex variable and the function `sqrt()` to take its square root.

As an example, we use the complex number $z = 3 + 3i$. An equivalent form of it would be $z = 3\sqrt{2} \left(\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i \right)$ which, in polar form, is the same as $z = 3\sqrt{2}e^{i\pi/4}$. One can compute its square root by making use of deMoivre's theorem

$$(e^{i\theta})^n = e^{in\theta}$$

which implies

$$z^{1/2} = (3\sqrt{2})^{1/2}e^{i\pi/8}$$

A numerical computation of $e^{i\pi/8}$ by hand is somewhat tedious. We present the output of the same computation being done using SciLab in the succeeding section.

Results

The code and the output are shown in Figure 1.

```
--> my_num = complex(3,3)
my_num =

    3. + 3.i

--> sqrt(my_num)
ans =

    1.9029767 + 0.7882388i
```

Figure 1: Square root of $z = 3 + 3i$ computed using two lines of code in SciLAB.

SciLab thus provides a much less mechanistic way to calculate square roots of complex numbers.