

MATLAB Assignment INTEGRATION

Background: The `int` and `quad` functions are two MATLAB integration functions. The `quad` function numerically calculates the definite integral of a function of one variable. The `int` function symbolically calculates the definite and indefinite integrals of a function over one of its variables.

We can numerically calculate the definite integral

$$\int_0^1 3 \sin \frac{x}{2} dx$$

```
using r = quad('3*sin(x/2)',0,1)
r =
0.7345
```

We can also symbolically calculate the indefinite integral

$$\int_{x_1}^{x_2} a \sin bx dx$$

with the command

```
r = int('a*sin(b*x)', 'x', 'x1', 'x2')
r =
-a*(cos(b*x2)-cos(b*x1))/b
```

PROBLEMS

1. (a) Calculate the complex integral

$$\int_{C_1} \sin(z) dz$$

where C_1 is the straight line path from $-1 + i$ to $2 - i$. as SHOWN IN FIGURE 1

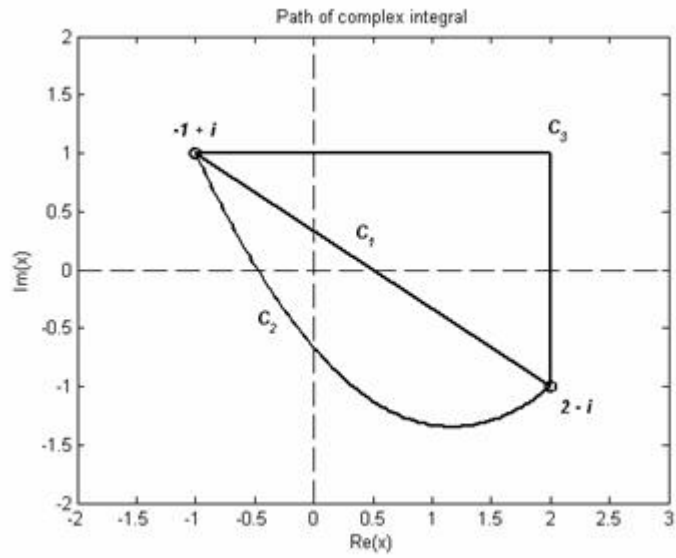


Figure 1

**1 (b) NOW CALCULATE SAME INTEGRAL ALONG C2 and C3
COMMENT ON RESULTS**

2. Calculate the integral of the complex function

$$f(z) = \frac{z+1}{z-(1+2i)}$$

over the paths C_1 , C_2 , and C_3 in Figure 2.

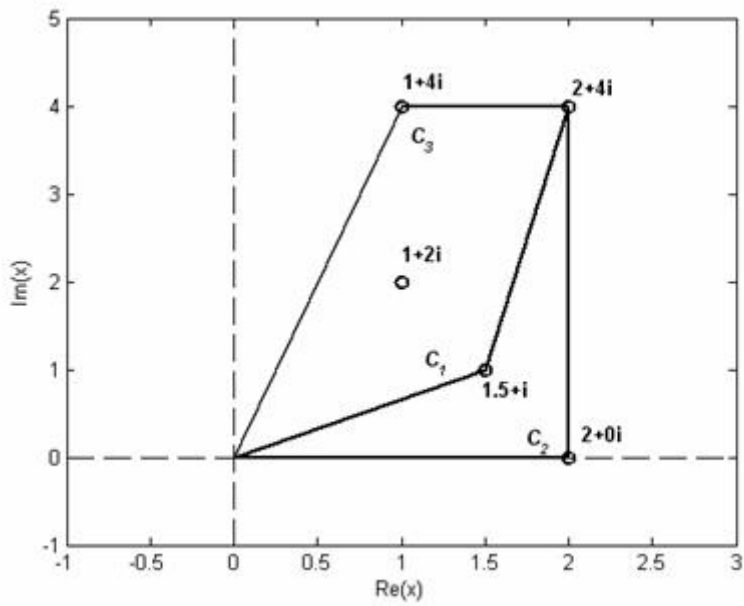


Figure 2

3. (a) Find the parametric representation of the path $C: z(x,y) = x + iy$, where $y^2 - x + 1 = 0$, as shown in Figure 3.

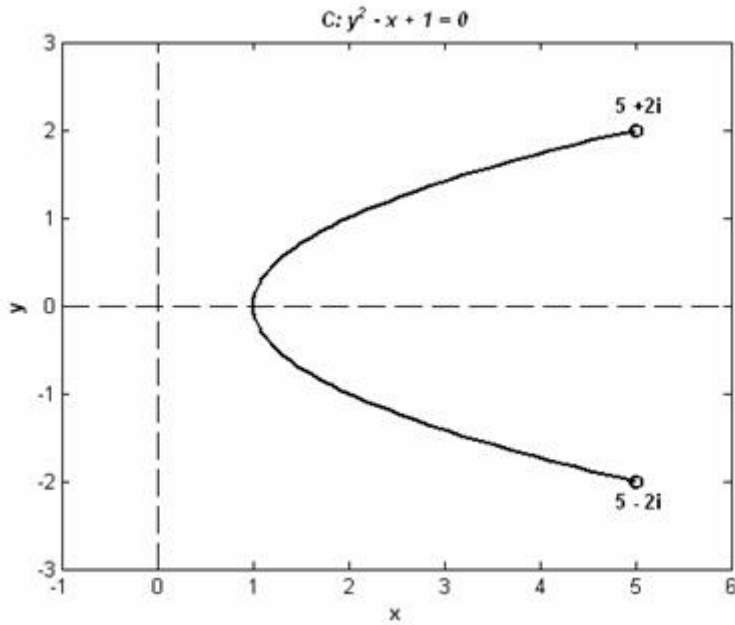


Figure 3

3(b) Now find path using PathRep function

4. Evaluate:

$$\int_C f(z) dz$$

Where:

$$f(z) = \frac{\bar{z}}{z-i}$$

And C is the path shown in Figure 3. Note that $z-i$ is a singular point of $f(z)$, but is not included on the path.