

Practical 8

Find a parametrization of the polygonal path

$$C = C_1 + C_2 + C_3$$

from $-1 + i$ to $3 - i$,

where C_1 is the line segment from: $-1 + i$ to -1 ,

C_2 is the line segment from: -1 to $1 + i$ and

C_3 is the line segment from $1 + i$ to $3 - i$.

Make a plot of this path.

1

$C_1 : -1+i \text{ -----} > -1$

$C_2 : -1 \text{ -----} > 1 + i$

$C_3 : 1+i \text{ -----} > 3 - i$

1.1

C_1

→ `kill(all);`

(%o0) *done*

→ `z1(t):=(-1)+%i*(1-t);`

(%o3) `z1(t):=-1+%i*(1-t)`

```

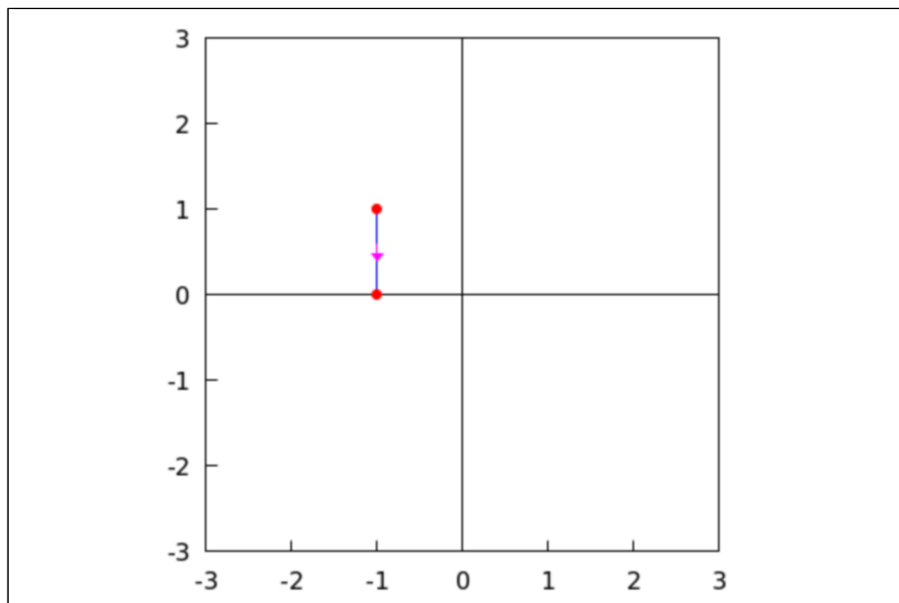
→ wxdraw2d(
    xaxis = true, xaxis_type = solid, xrange = [-3, 3],
    yaxis = true, yaxis_type = solid, yrange = [-3, 3],
    proportional_axes = xy,

    parametric(realpart(z1(t)), imagpart(z1(t)), t, 0, 1),
    head_length = 0.2,
    head_angle = 20,
    color = magenta,
    vector([-1, 0.6], [0, -0.2]),
    color = red,
    point_type = 7,
    point_size = 1,
    points([[ -1, 1], [ -1, 0]])

);

```

(%t28)



(%o28)

1.2

C2

```

→ z2(t):=(-1+2·t)+%i·t;
(%o5) z2(t):=-1+2 t+%i t

```

```

→ z2(1/2);
(%o8)  $\frac{\%i}{2}$ 

```

```

→ z2(1/3);
(%o9)  $\frac{\%i}{3} - \frac{1}{3}$ 

```

```

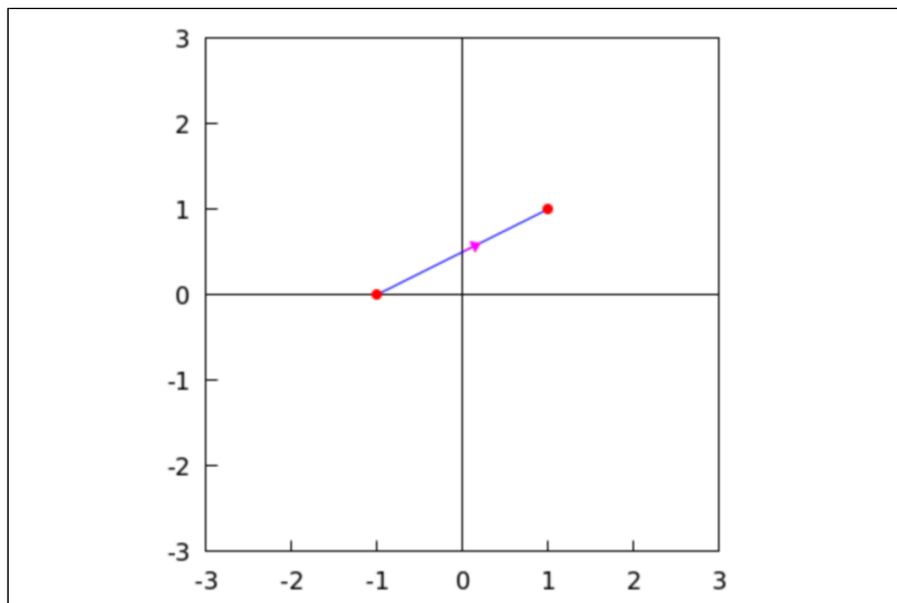
→ wxdraw2d(
    xaxis = true, xaxis_type = solid, xrange = [-3, 3],
    yaxis = true, yaxis_type = solid, yrange = [-3, 3],
    proportional_axes = xy,

    parametric(realpart(z2(t)), imagpart(z2(t)), t, 0, 1),
    head_length = 0.2,
    head_angle = 20,
    color = magenta,
    vector([0, 1/2], [2/10, 1/10]),
    color = red,
    point_type = 7,
    point_size = 1,
    points([[1, 1], [-1, 0]])

);

```

(%t25)



(%o25)

1.3

C3

```

→ z3(t):=(1+2·t)+%i·(1-2·t);
(%o14) z3(t):= 1 + 2 t + %i (1 - 2 t)

```

```

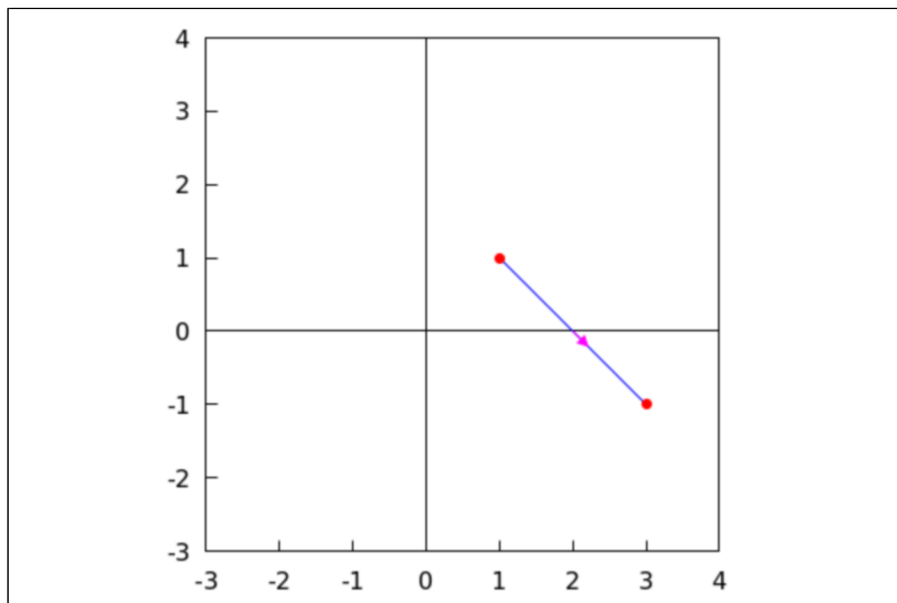
→ wxdraw2d(
    xaxis = true, xaxis_type = solid, xrange = [-3, 4],
    yaxis = true, yaxis_type = solid, yrange = [-3, 4],
    proportional_axes = xy,

    parametric(realpart(z3(t)), imagpart(z3(t)), t, 0, 1),
    head_length = 0.2,
    head_angle = 20,
    color = magenta,
    vector([2, 0], [2/10, -2/10]),
    color = red,
    point_type = 7,
    point_size = 1,
    points([[1, 1], [3, -1]])

);

```

(%t22)



(%o22)

1.4

$C1 + C2 + C3$

```

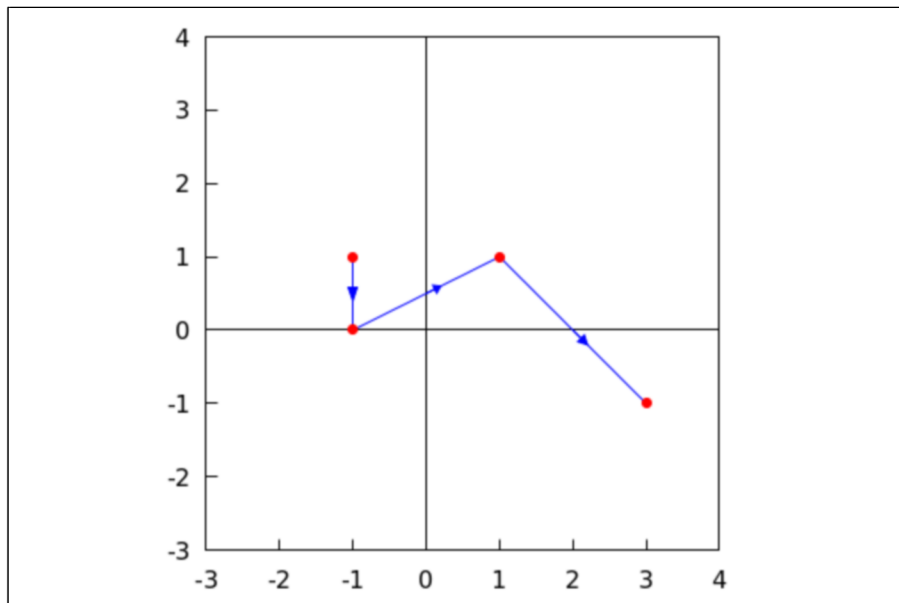
→ wxdraw2d(
    xaxis = true, xaxis_type = solid, xrange = [-3, 4],
    yaxis = true, yaxis_type = solid, yrange = [-3, 4],
    proportional_axes = xy,

    parametric(realpart(z1(t)), imagpart(z1(t)), t, 0, 1),
    parametric(realpart(z2(t)), imagpart(z2(t)), t, 0, 1),
    parametric(realpart(z3(t)), imagpart(z3(t)), t, 0, 1),
    head_length = 0.2,
    head_angle = 20,
    vector([-1, 0.8], [0, -0.4]),
    vector([0, 1/2], [2/10, 1/10]),
    vector([2, 0], [2/10, -2/10]),
    color = red,
    point_type = 7,
    point_size = 1,
    points([[-1, 1], [-1, 0], [1, 1], [3, -1]])

);

```

(%t31)



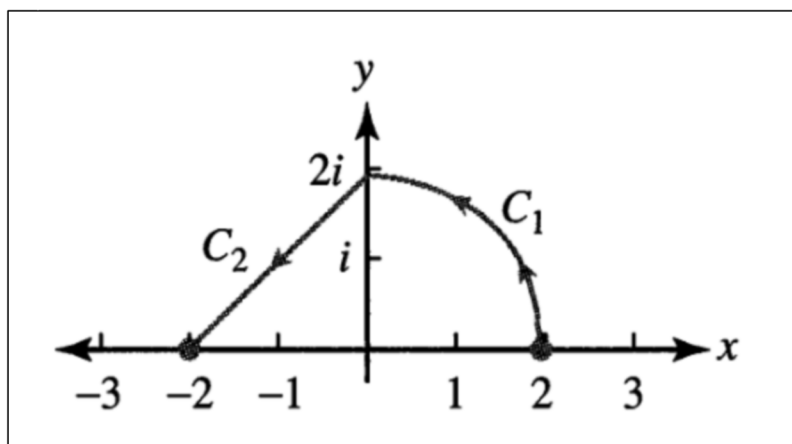
(%o31)

2

Exercise

1. Give a parametrization of the contour $C_1 + C_2$ and make a plot of this path.

Figure 1:



2. Give a parametrization of the contour $C_1 + C_2 + C_3$ and make a plot of this path.

Figure 2:

