

物理数学 I 第2回目 $\sin(z)$ の振る舞い

```
> restart
```

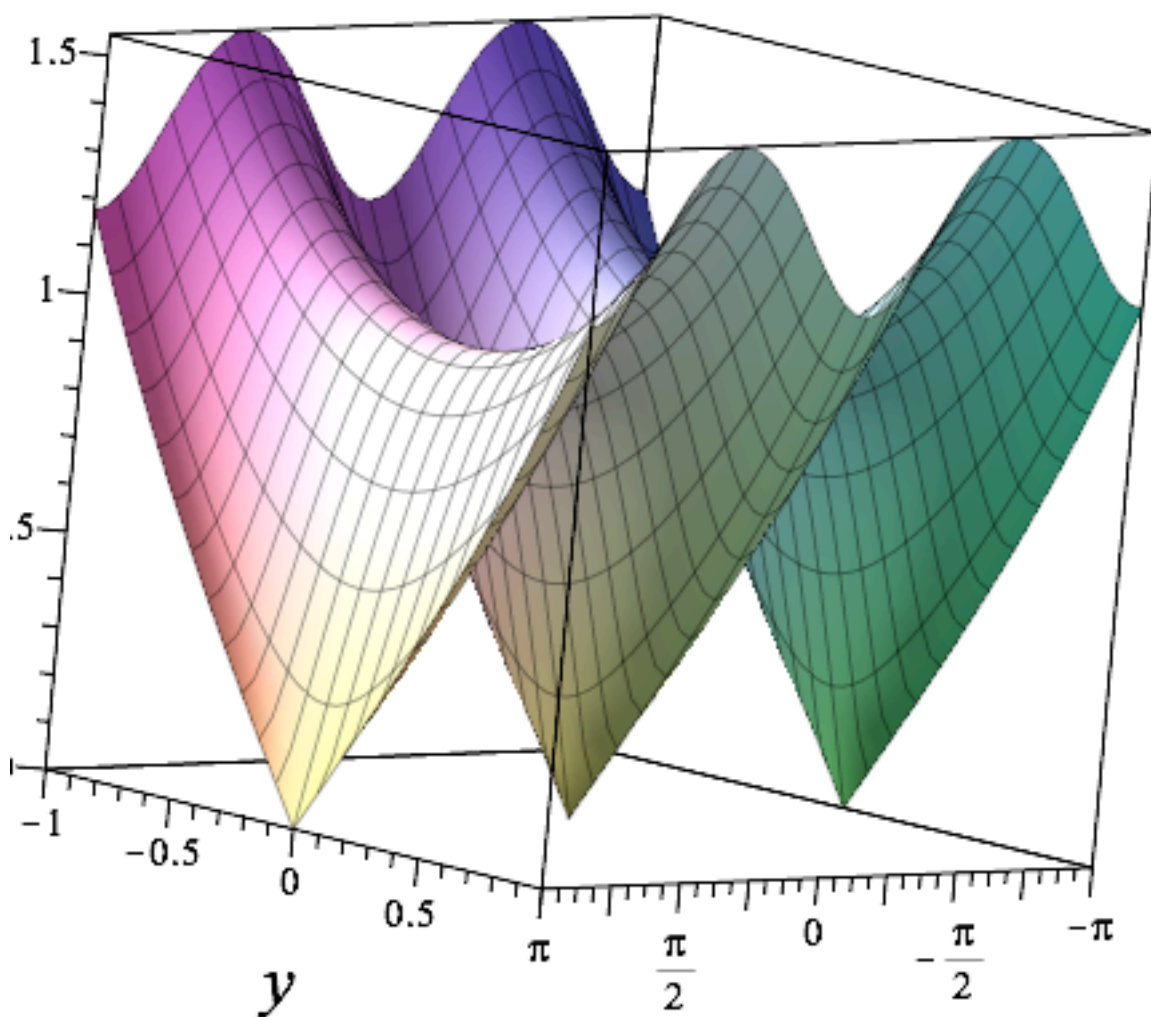
```
> z := Complex(x, y);
```

```
z := Complex(x, y)
```

(1)

| $\sin(z)$ | の3次元プロット

```
> plot3d(abs(sin(z)), x=-Pi..Pi, y=-1..1, labelfont=[20, 20])
```



```
> a1 := seq(abs(sin(z)), y=0..1, 0.25)
```

(2)

```
a1 := |sin(Complex(x, 0))|, |sin(Complex(x, 0.25))|, |sin(Complex(x, 0.50))|,
      |sin(Complex(x, 0.75))|, |sin(Complex(x, 1.00))|
```

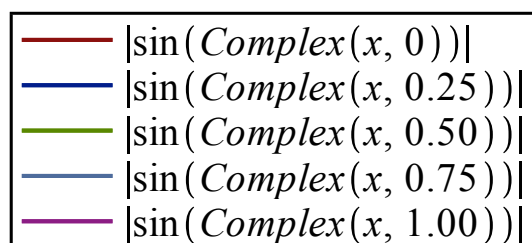
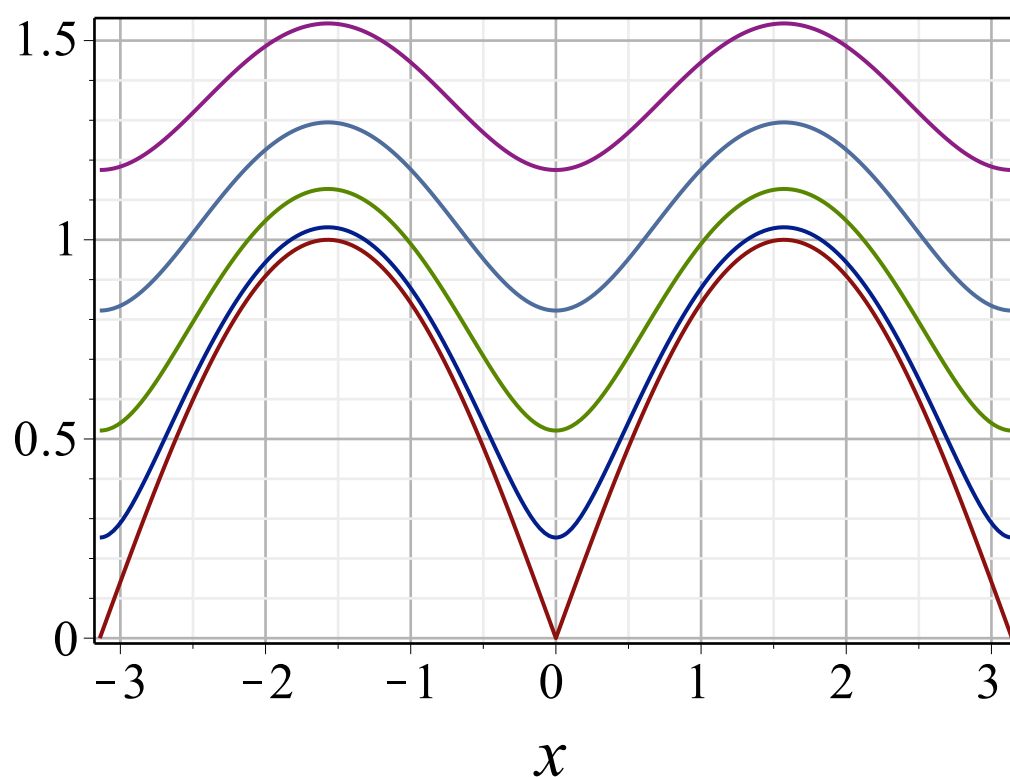
(2)

```
> c1 := seq("t", t=0..1, 0.25)
      c1 := "t", "t", "t", "t", "t"
```

(3)

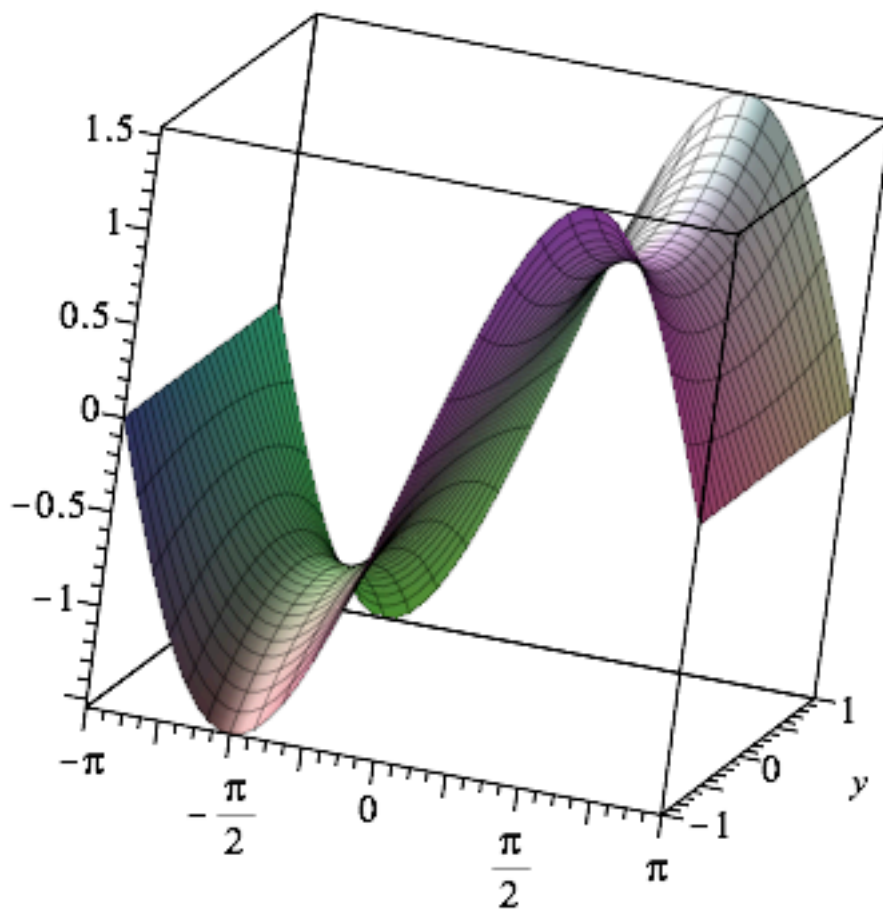
$|\sin(x+iy)|$ の x 依存性。ここで、 y は、0 から 1 までの間を、0.25 刻みで変化させている。実関数の場合と異なり、 $|\sin(x+iy)|$ が 1 より大きくなることに気づいてもらいたい。

```
> plot([seq(abs(sin(z)), y=0..1, 0.25)], x=-Pi..Pi, labelfont=[20, 20], gridlines, axes
      = box, axesfont=[15, 15], legend=[a1])
```



$\text{Re}[\sin(x+iy)]$

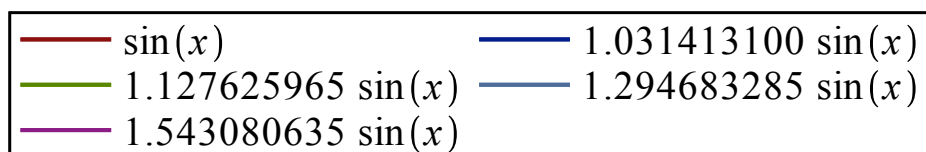
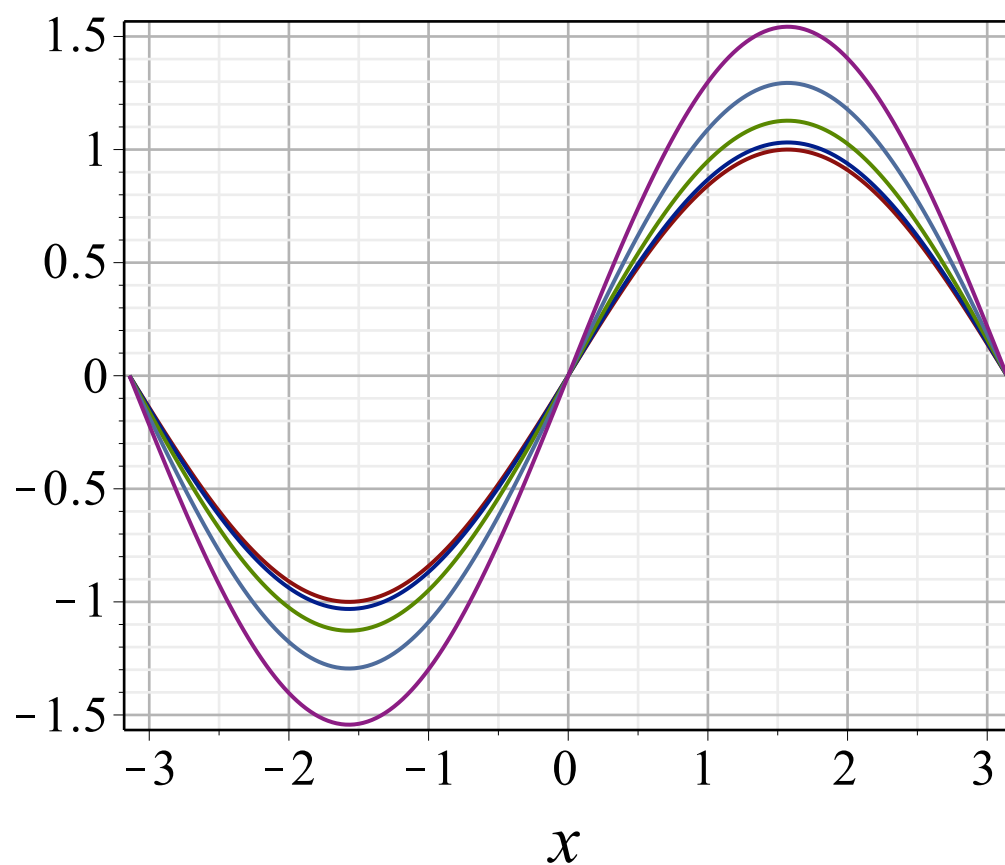
```
> plot3d(Re(sin(z)), x=-Pi..Pi, y=-1..1)
```



```
> a2 := seq(Re(sin(z)), y = 0..1, 0.25)
a2 := sin(x), 1.031413100 sin(x), 1.127625965 sin(x), 1.294683285 sin(x),
      1.543080635 sin(x)
```

(4)

```
> plot([seq(Re(sin(z)), y = 0..1, 0.25)], x = -Pi..Pi, labelfont = [20, 20], gridlines, axes
      = box, axesfont = [15, 15], legend = [a2])
```



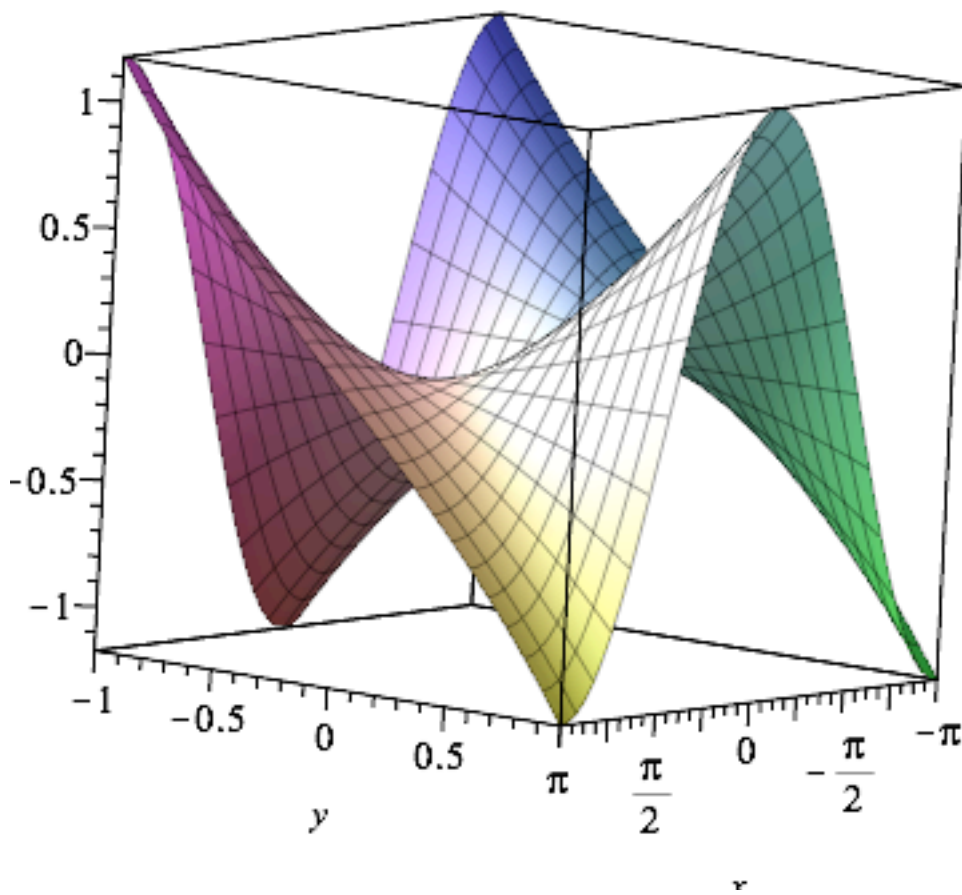
$\text{Im}[\sin(x+iy)]$

$\text{a3} := \text{seq}(\text{Im}(\sin(z)), y = 0..1, 0.25)$

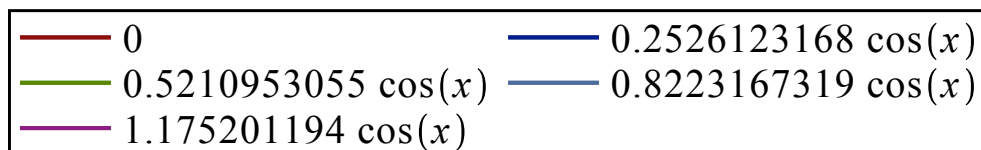
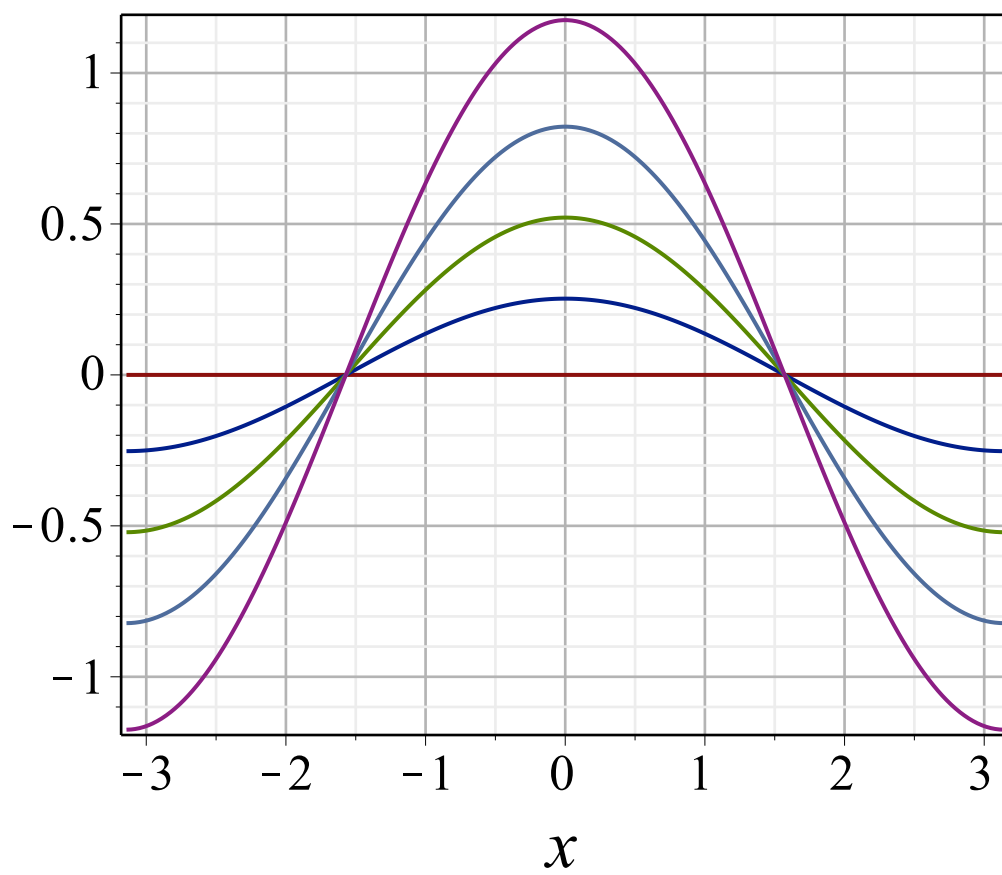
$\text{a3} := 0, 0.2526123168 \cos(x), 0.5210953055 \cos(x), 0.8223167319 \cos(x),$
 $1.175201194 \cos(x)$

$\text{plot3d}(\text{Im}(\sin(z)), x = -\text{Pi}..\text{Pi}, y = -1..1)$

(5)



```
> plot([seq(Im(sin(z)), y = 0..1, 0.25)], x = -Pi..Pi, labelfont = [20, 20], gridlines, axes
      = box, axesfont = [15, 15], legend = [a3])
```



>