

1 基本のき

```
> eq1:=(x+1)/(x-1)/(x^2+1)^2;
convert(eq1,parfrac);
```

$$eq1 := \frac{x+1}{(x-1)(x^2+1)^2}$$

$$\frac{1}{2(x-1)} + \frac{1}{2} \frac{-x-1}{x^2+1} - \frac{x}{(x^2+1)^2}$$

(1.1)

```
> diff(x*sin(x),x$100);
-100*cos(x) + x*sin(x)
```

(1.2)

```
> int(x/(x^2-2*x+1),x);
```

$$\ln(x-1) - \frac{1}{x-1}$$

(1.3)

```
> int(arctan(x)/(x^2+1),x=0..infinity);
```

$$\frac{1}{8} \pi^2$$

(1.4)

2 式変形

```
> f:=unapply(x^2-3*x+5,x);
f:=x->x^2-3*x+5
```

(2.1)

```
> x0:=5;
a:=subs(x=x0,diff(f(x),x));
x0:=5
a:=7
```

(2.2)

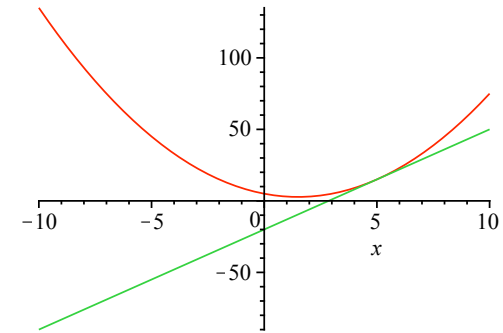
```
> eq1:=y-f(x0)=a*(x-x0);
eq1:=y-15=7*x-35
```

(2.3)

```
> eq2:=solve(eq1,y);
eq2:=-20+7*x
```

(2.4)

```
> plot([f(x),eq2],x);
```



3 微積

```
> F2:=unapply(x/(x^2-1*x+4),x);
```

$$F2 := x \rightarrow \frac{x}{x^2 - x + 4}$$

(3.1)

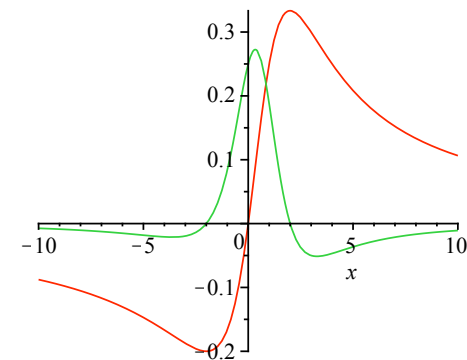
```
> eq2:=diff(F2(x),x)=0;
solve(eq2,x);
```

$$eq2 := \frac{1}{x^2 - x + 4} - \frac{x(2x-1)}{(x^2 - x + 4)^2} = 0$$

$$-2, 2$$

(3.2)

```
> plot([F2(x),diff(F2(x),x)],x);
```



4 線形代数

```
> with(LinearAlgebra):
```

```
A:=Matrix([[2,1,1],[1,2,1],[0,0,1]]);
```

$$A := \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

(4.1)

```
> l,P:=Eigenvectors(A);
```

$$l,P := \begin{bmatrix} 1 \\ 1 \\ 3 \end{bmatrix}, \begin{bmatrix} -1 & -1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \end{bmatrix}$$

(4.2)

```
> MatrixInverse(P).A.P;
```

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

(4.3)

5 正規分布

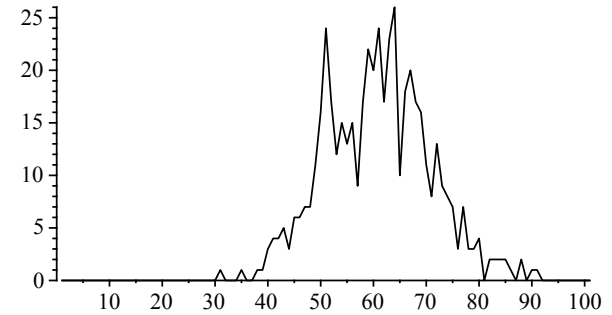
```
> normal_dist:=proc(m,s)
  local x,i;
  x:=0.0;
  for i from 1 to 12 do
    x:=x+evalf(rand()/10^12);
  end do;
  x:=x-6.0;
  return round((x*s+m));
end proc;
```

```
> n:=500;
sum1:=0;
sum2:=0;
list1:=Array(0..100);
for j from 1 to n do
  ind:=normal_dist(60,10);
  list1[ind]:=list1[ind]+1;
  sum1:=sum1+ind;
  sum2:=sum2+ind^2;
end do;
```

n:=500

(5.1)

```
> with(plots):
listplot(convert(list1,list));
```



```
> mean:=evalf(sum1/n);
      mean:=59.7680000000 (5.2)
```

```
> evalf(sqrt((sum2/n-mean^2)));
      9.9350981880 (5.3)
```

注) 正規分布をランダムに出力する関数としては、Mapleでは次の関数が用意されている。

```
> ind:=round(stats[random,normald[60,10]](1));
      ind:=73 (5.4)
```