EXPERIMENT NO : 5

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ROLL NO : 48

AIM : To solve the problems for continuous random variables using Normal and Uniform Probability Distributions.

In [73]:
```python
import numpy as np
from scipy.stats import norm, uniform
```

1.Normal Distribution

In [74]:
```python
mu = 0
```

In [75]:
```python
sigma = 1
```

In [76]:
```python
x = 0
```

In [77]:
```python
pdf_value = norm.pdf(x, mu, sigma)
```

In [78]:
```python
print("Probability density function at", x, ":", pdf_value)
```
Probability density function at 0 : 0.3989422804014327

In [79]:
```python
cdf_value = norm.cdf(x, mu, sigma)
```

In [80]:
```python
print("Cumulative distribution function at", x, ":", cdf_value)
```
Cumulative distribution function at 0 : 0.5

In [81]:
```python
mean_value = norm.mean(mu, sigma)
print("Mean of the normal distribution:", mean_value)
```
Mean of the normal distribution: 0.0

In [82]:
```python
variance_value = norm.var(mu, sigma)
```

In [83]:
```python
print("Variance of the normal distribution:", variance_value)
```
Variance of the normal distribution: 1.0

In [84]:
```python
std_deviation_value = norm.std(mu, sigma)
print("Standard deviation of the normal distribution:", std_deviation_value)
```
Standard deviation of the normal distribution: 1.0

SELF QUESTION

In [85]:

```python
## Modules to be imported –
import numpy as np
from scipy.stats import norm, uniform
mu = 2
sigma = 3
x = 0
pdf_value = norm.pdf(x, mu, sigma)
print("Probability density function at", x, ":", pdf_value)
cdf_value = norm.cdf(x, mu, sigma)
print("Cumulative distribution function at", x, ":", cdf_value)
mean_value = norm.mean(mu, sigma)
print("Mean of the normal distribution:", mean_value)
variance_value = norm.var(mu, sigma)
print("Variance of the normal distribution:", variance_value)
std_deviation_value = norm.std(mu, sigma)
print("Standard deviation of the normal distribution:", std_deviation_value)
```

```
Probability density function at 0 : 0.10648266850745075
Cumulative distribution function at 0 : 0.2524925375469229
Mean of the normal distribution: 2.0
Variance of the normal distribution: 9.0
Standard deviation of the normal distribution: 3.0
```

2.Uniform Distribu�on

In [86]:

```python
a = 0
b = 1
```

In [87]:

```python
x = 0.5
pdf_value = uniform.pdf(x, a, b-a)
print("Probability density function at", x, ":", pdf_value)
```

```
Probability density function at 0.500000000000000 : 1.0
```

In [88]:

```python
cdf_value = uniform.cdf(x, a, b-a)
print("Cumulative distribution function at", x, ":", cdf_value)
```

```
Cumulative distribution function at 0.500000000000000 : 0.5
```

In [89]:

```python
p = 0.7
quantile_value = uniform.ppf(p, a, b-a)
print("Quantile function at", p, ":", quantile_value)
```

```
Quantile function at 0.700000000000000 : 0.7
```

In [90]:

```python
mean_value = uniform.mean(a, b-a)
```

In [91]:

```python
print("Mean of the uniform distribution:", mean_value)
```

```
Mean of the uniform distribution: 0.5
```

In [92]:

```python
variance_value = uniform.var(a, b-a)
print("Variance of the uniform distribution:", variance_value)
```

```
Variance of the uniform distribution: 0.08333333333333333
```

```
std_deviation_value = uniform.std(a, b-a)
print("Standard deviation of the uniform distribution:", std_deviation_value)
```

Standard deviation of the uniform distribution: 0.28867513459481287

SELF QUESTION

In [94]:

```
a = 0
b = 1
x = 0.4
pdf_value = uniform.pdf(x, a, b-a)
print("Probability density function at", x, ":", pdf_value)
cdf_value = uniform.cdf(x, a, b-a)
print("Cumulative distribution function at", x, ":", cdf_value)
p = 0.7
quantile_value = uniform.ppf(p, a, b-a)
print("Quantile function at", p, ":", quantile_value)
mean_value = uniform.mean(a, b-a)
print("Mean of the uniform distribution:", mean_value)
variance_value = uniform.var(a, b-a)
print("Variance of the uniform distribution:", variance_value)
std_deviation_value = uniform.std(a, b-a)
print("Standard deviation of the uniform distribution:", std_deviation_value)
```

Probability density function at 0.400000000000000 : 1.0
Cumulative distribution function at 0.400000000000000 : 0.4
Quantile function at 0.700000000000000 : 0.7
Mean of the uniform distribution: 0.5
Variance of the uniform distribution: 0.08333333333333333
Standard deviation of the uniform distribution: 0.28867513459481287

Conclusion: The problems for continuous random variables using Normal and Uniform Probability Distributions are studied successfull.