> #` `*Testing the MAPLE random number generator*

> #*According* **to** *the theory of uniform distribution*

> #` `*Expected value* $\mu x = \frac{(b+a)}{2}$

> #` `*Dispersion* $\mathbf{D} = \frac{(b-a)^2}{12}$

```
> restart;
> a := 0; b := 1;
```

$$a := 0$$
$$b := 1 \quad \textbf{(1)}$$

```
> μx_T := (b+a)/2.; #Theoretical average value
```

$$\mu x\_T := 0.5000000000 \quad \textbf{(2)}$$

```
> D_T := (b-a)^2/12.;#Theoretical value of dispersion
```

$$D\_T := 0.08333333333 \quad \textbf{(3)}$$

```
> Trn := 10;
```

$$Trn := 10 \quad \textbf{(4)}$$

```
> #Trn = 1; 10; 100; 1000; 10000;
> rrm := evalf( rand(Trn·a..Trn·b)/Trn );
```

```
rrm := 0.1000000000 proc( )                                                    (5)
    proc( ) option builtin = RandNumberInterface;  end proc(6, 11, 4)
end proc
> rrm( );
```

0.6000000000 **(6)**

```
>
> for i from 1 to 10 do
    print(rrm( )) : end do:
```

0.9000000000
0.5000000000
0.1000000000
1.000000000
0.3000000000
0.5000000000
0.4000000000
1.000000000
0.
0.7000000000 **(7)**

```
> # Nexp = 100; 1000; 10000; 100000; 1000000;
> Nexp := 100;
```

$$Nexp := 100 \quad (8)$$

```
>
> μx_Ex := 0;
```

$$\mu x\_Ex := 0 \quad (9)$$

```
>
> for i from 1 to Nexp do
  rn[i] := rrm( ) :
  μx_Ex := μx_Ex + evalf( rn[i] / Nexp ) end do:
> μx_Ex;#Calculated average value
```

$$0.5390000000 \quad (10)$$

```
> D_Ex := 0;
```

$$D\_Ex := 0 \quad (11)$$

```
> for i from 1 to Nexp do
  D_Ex := D_Ex + (rn[i] − μx_Ex)^2 / Nexp end do:
> D_Ex;#Calculated dispersion value
```

$$0.1075790000 \quad (12)$$

```
> μx_T − μx_Ex; #Deviation from theoretical value
```

$$-0.0390000000 \quad (13)$$

```
> D_T − D_Ex;#Deviation from theoretical value
```

$$-0.02424566667 \quad (14)$$

```
>
>
>
```