

# ANALYSE NUMERIQUE EX1 du TD1

## Les Graphes

>

> **L0:=x->x^2/2-x/2;**

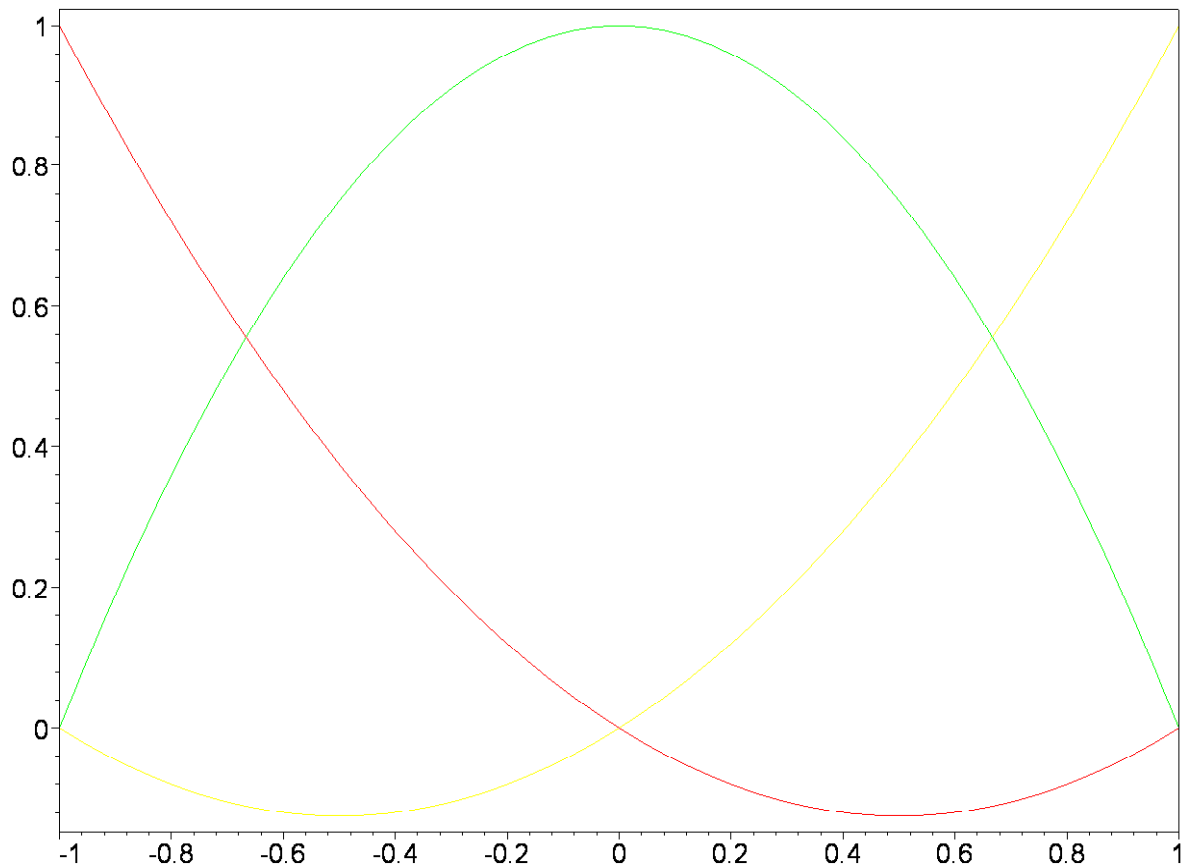
> **L1:=x->1-x\*\*2;**

$$L1 := x \rightarrow 1 - x^2$$

> **L2:=x->x^2/2+x/2;**

$$L2 := x \rightarrow \frac{1}{2}x^2 + \frac{1}{2}x$$

> **plot({L0,L1,L2}, -1..1);**



Elements de la base de Lagrange (question 1)

> **a0:=exp(-1.);a1:=exp(0.);a2:=exp(1.);**

$$a0 := .3678794412$$

$$a1 := 1.$$

$$a2 := 2.718281828$$

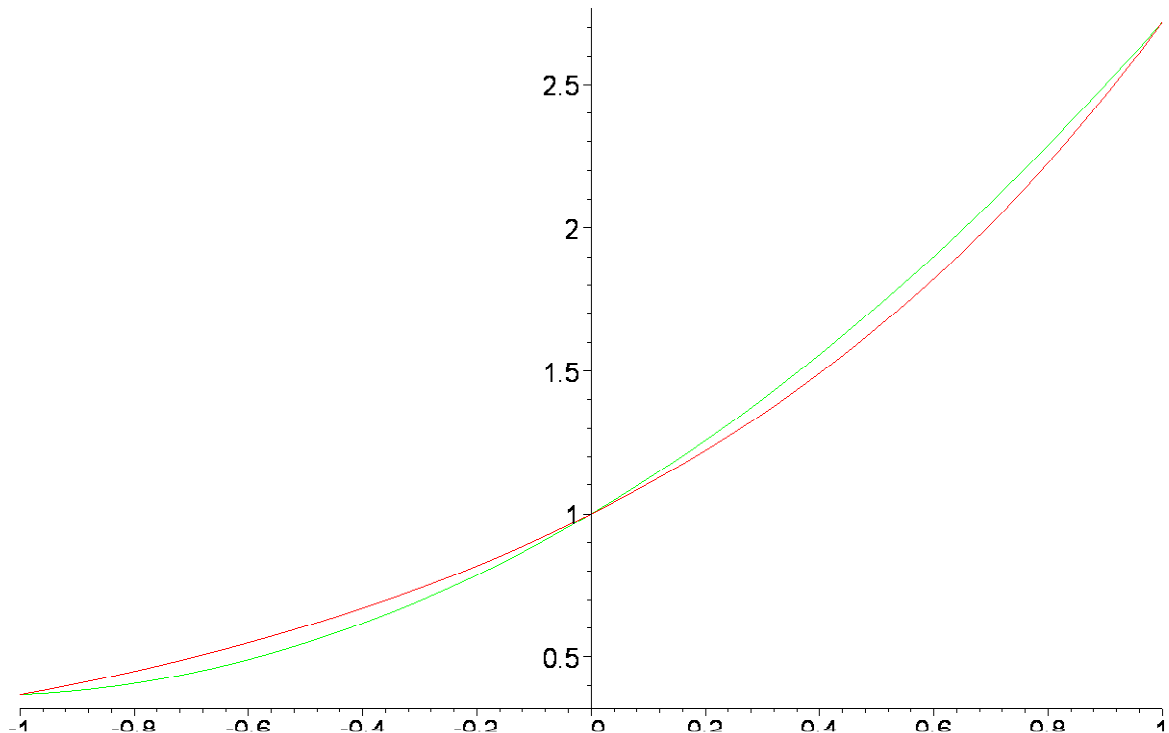
> **pol:=x->a0\*L0(x)+a1\*L1(x)+a2\*L2(x);**

$$pol := x \rightarrow a0 L0(x) + a1 L1(x) + a2 L2(x)$$

> **(pol(0.5)-exp(0.5))/exp(0.5);**

$$.04527720138$$

```
> plot({exp,pol}, -1..1);
```



### function exp(x) et son interpolant de Lagrange (Q. 4)

```
> runge:=x->1/(1+100*(x-0.)^2);a0:=runge(-1.);a1:=runge(0.);a2:=runge(1.);
```

$$runge := x \rightarrow \frac{1}{1 + 100 x^2}$$

$$a0 := .009900990099$$

$$a1 := 1.$$

$$a2 := .009900990099$$

```
> pol:=x->a0*L0(x)+a1*L1(x)+a2*L2(x);
```

```
> pol(x);
```

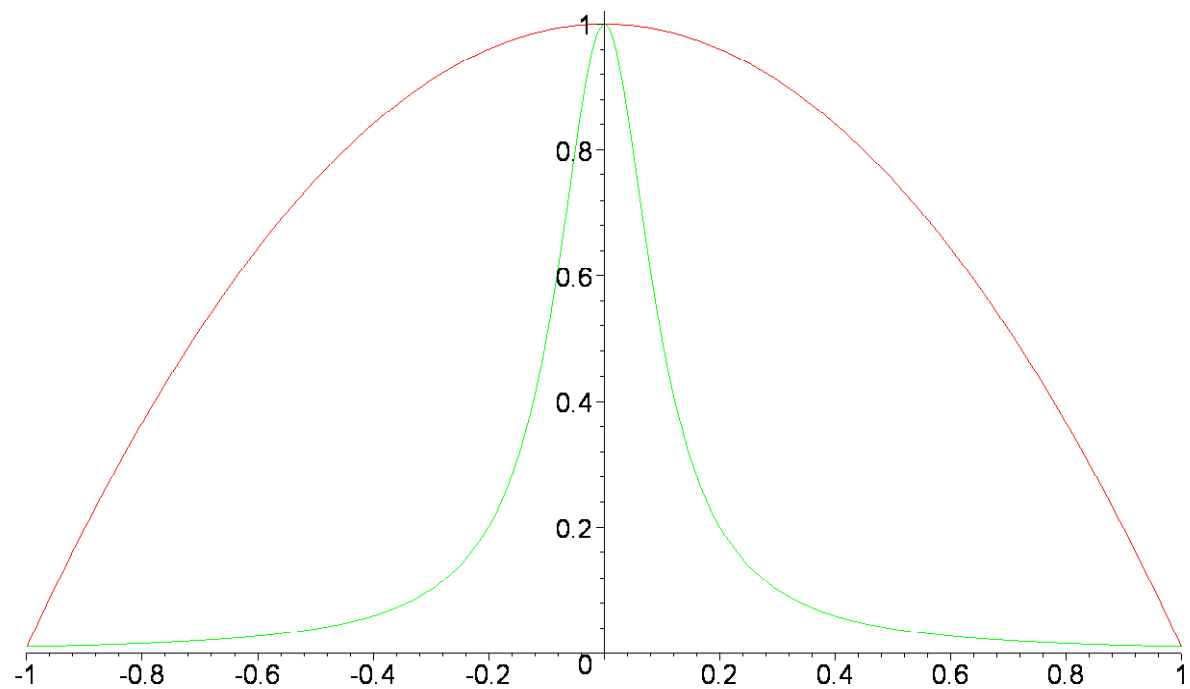
$$pol := x \rightarrow a0 L0(x) + a1 L1(x) + a2 L2(x)$$

$$-.9900990099 x^2 + 1.$$

```
> (pol(0.5)-runge(0.5))/runge(0.5);
```

$$18.56435643$$

```
> plot({runge,pol}, -1..1);
```



**Function de Runge et son interpolant de Lagrange (Q. 5)**

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