

Travaux Pratiques TP N°2

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LMD : Génie Energétique

Matière : Outils Numériques

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```
> restart
```

```
> ni := 4 ; ns := 8 ; a := 3 ; b := 6;
```

```
ni := 4
```

```
ns := 8
```

```
a := 3
```

```
b := 6
```

(1)

```
> f := e^x
```

```
f := e^x
```

(2)

```
> for i from ni to ns do p[i] := convert(taylor(f, x=0, i), polynom) end do
```

$$p_4 := 1 + x + \frac{1}{2} x^2 + \frac{1}{6} x^3$$

$$p_5 := 1 + x + \frac{1}{2} x^2 + \frac{1}{6} x^3 + \frac{1}{24} x^4$$

$$p_6 := 1 + x + \frac{1}{2} x^2 + \frac{1}{6} x^3 + \frac{1}{24} x^4 + \frac{1}{120} x^5$$

$$p_7 := 1 + x + \frac{1}{2} x^2 + \frac{1}{6} x^3 + \frac{1}{24} x^4 + \frac{1}{120} x^5 + \frac{1}{720} x^6$$

$$p_8 := 1 + x + \frac{1}{2} x^2 + \frac{1}{6} x^3 + \frac{1}{24} x^4 + \frac{1}{120} x^5 + \frac{1}{720} x^6 + \frac{1}{5040} x^7$$

(3)

```
> C0 := plot(f, x = a..b, color = blue, legend = f, style = point) :
```

```
for i from ns by -1 to ni do C[i] := plot(p[i], x = a..b, color = ColorTools:-Color([rand()  
/10^12, rand()/10^12, rand()/10^12]), legend = i "termes") end do:
```

```
plots[display]([C0, seq(C[i], i = ns..ni, -1)], labels = [x, f]
```

```
, title = "Approximation de la fonction " f " par des séries de Taylor", font = [TIMES, BOLD,  
12], legendstyle = [location = right, font = [HELVETICA, BOLD, 10]]);
```

"Approximation de la fonction " e^x " par des séries de Taylor"

