

MATLAB-PDE Toolbox TP3

Exercice 1:

```
f = @(x) x.*exp(-x) - x.^0.8 + 0.2;  
result = integral(f, 0, 8);  
disp(['La valeur de l'intégrale est ', num2str(result)]);
```

```
>> La valeur de l'intégrale est -20.8609
```

Exercice 2:

```
temps = 0:7; % Temps en secondes  
vitesse_mph = [0 1 4 39 69 95 114 129]; % Vitesse en mi/h  
vitesse_mps = vitesse_mph / 3600; % Conversion en mi/s  
disp(vitesse_mps);  
distance = trapz(temps, vitesse_mps); % Distance en miles  
disp(['La distance totale parcourue est ', num2str(distance), ' miles']);
```

```
>>
```

```
0 0.0003 0.0011 0.0108 0.0192 0.0264 0.0317 0.0358
```

```
La distance totale parcourue est 0.10736 miles
```

Exercice 3:

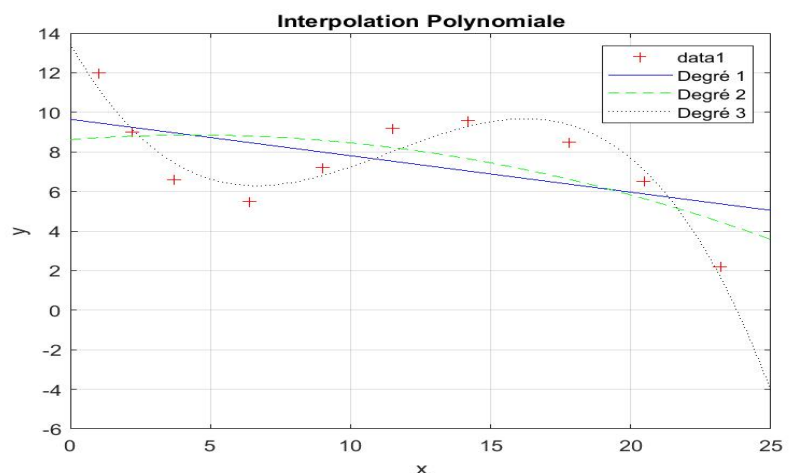
```
x = [1 2.2 3.7 6.4 9 11.5 14.2 17.8 20.5 23.2];  
y = [12 9 6.6 5.5 7.2 9.2 9.6 8.5 6.5 2.2];  
xint=0:0.1:25;
```

```
% Polynôme de degré 1  
p1 = polyfit(x, y, 1);  
y1 = polyval(p1, xint);
```

```
% Polynôme de degré 2  
p2 = polyfit(x, y, 2);  
y2 = polyval(p2, xint);
```

```
% Polynôme de degré 3  
p3 = polyfit(x, y, 3);  
y3 = polyval(p3, xint);
```

```
% Tracé  
figure;  
plot(x, y, '+r');  
hold on;  
plot(xint, y1, '-b', 'DisplayName', 'Degré 1');  
plot(xint, y2, '--g', 'DisplayName', 'Degré 2');  
plot(xint, y3, ':k', 'DisplayName', 'Degré 3');  
legend;  
title('Interpolation Polynomiale');  
xlabel('x');  
ylabel('y');  
grid on;
```



Exercice 4:

```
function [b, m] = expofit(x, y)  
    log_y = log(y); % forme linéaire : log(y) = log(b) + mx  
    p = polyfit(x, log_y, 1);  
    m = p(1);  
    log_b = p(2);  
    b = exp(log_b);  
end
```

```
x = [0.4 2.2 3.1 5.0 6.6 7.6];  
y = [1.7 10.1 26.9 61.2 158 398];  
  
[b, m] = expofit(x, y);  
disp(['b = ', num2str(b), ', m = ', num2str(m)]);  
  
% Courbe ajustée exponentielle  
x_fit = linspace(min(x), max(x), 100);  
y_fit = b * exp(m * x_fit);  
  
% Tracé  
figure;  
scatter(x, y, 'r', 'filled'); hold on;  
plot(x_fit, y_fit, '-b', 'LineWidth', 1.5);  
legend('Points de données', 'Ajustement exponentiel');  
title('Ajustement Exponentiel');  
xlabel('x');  
ylabel('y');  
grid on;
```

