

Homework1

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Homework1.1

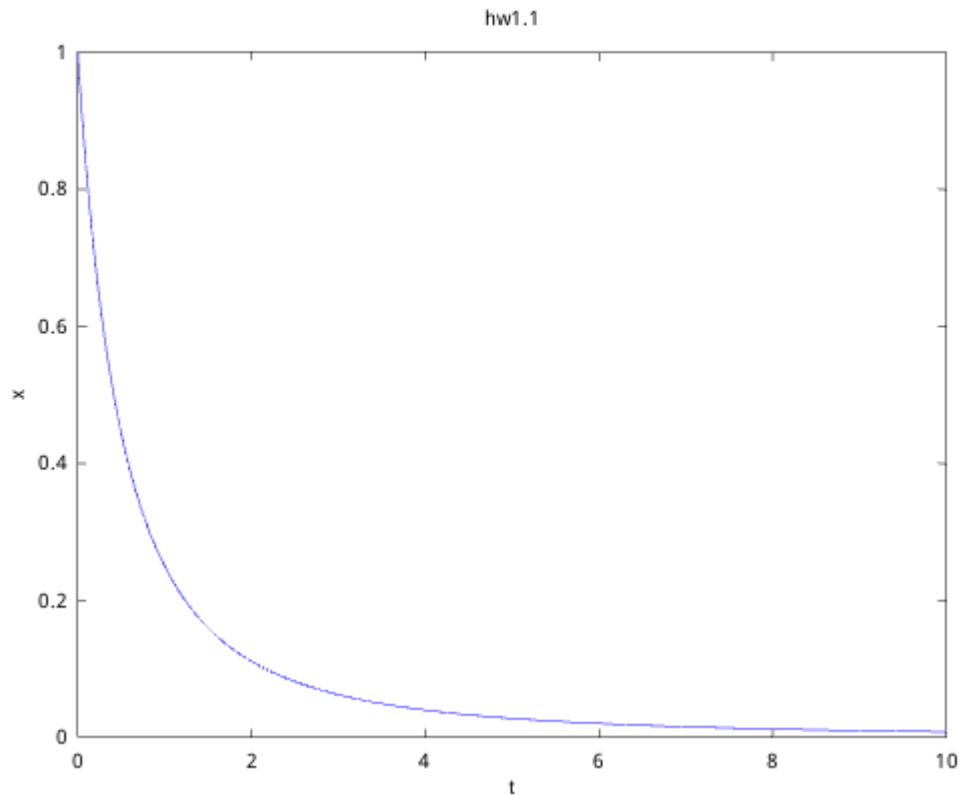
The Mathematical Equations

$$\frac{x(t_{n+1}) - x(t_n)}{\Delta t} = -x(t_{n+1})$$
$$(1 + \Delta t)x(t_{n+1}) = x(t_n)$$
$$x(t_{n+1}) = \frac{x(t_n)}{1 + \Delta t}$$
$$x(t_n) = \frac{1}{(1 + \Delta t)^n}$$

Source Code

```
% hw1.1
delta_t = 0.01;
t = [0 : delta_t : 10];
% the formula derived
x_tn = 1 ./ (1 + t).^2;
plot(t, x_tn), xlabel('t'), ylabel('x'), title('hw1.1');
```

Output



Homework1.2

The Linear Equations

$$k(-T_{j-1} + 2T_j - T_{j+1}) = 0$$

$$2T_2 - T_3 = 30$$

$$-T_2 + 2T_3 - T_4 = 0$$

$$-T_3 + 2T_4 = 100$$

Source Code

```
% hw1.2
A = [2, -1, 0;
     -1, 2, -1;
     0, -1, 2];
B = [30; 0; 100];
```

```
% solve linear equation  $AX = B$ 
```

```
 $X = A \backslash B$ 
```

Output

```
>> hw1_2
```

```
X =
```

```
47.500
```

```
65.000
```

```
82.500
```

```
>>
```