Lab exercises
Degree in mechanical engineering
AY 2014-15

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Solve the following problems in Matlab

1. Compute $a^2 - b^2$ with $a = 1.4 \cdot 10^{154}$ and $b = 1.3 \cdot 10^{154}$. What do you see? How to solve the problem in a stable way?

2. Let $x = 8.88178419700125 \cdot 10^{-16}$. Compute the expression

$$\frac{(1+x)-1}{x}.$$

   Why the result is more accurate of taking $x = 8.0 \cdot 10^{-16}$?

3. Write the Matlab code that computes the expression

$$f(x) = \frac{e^x - 1}{x}$$

   when x assumes the values

```
x=[0.2, 1.e-1, 1.e-2, 1.e-5, 1.e-6, 1.e-10, 1.e-15, 1.e-16];
```

4. Write the Matlab code that computes the *machine precision*, `eps`.

Time: **2 hours**.