f)

Compute the absolute error between the two obtained prices. What can you conclude?

We can conclude that the European call prices computed using the polynomial expansion approach and the Monte Carlo simulation are quite similar for the given parameters. As a matter of fact, the absolute error between the two is in the order of 10^-4. Therefore, the choice of the method does not have much impact on the resulting price.

However, if we compute the time spent by the two method, our results show, as expected, that the Monte Carlo approach is remarkably slower (3.7 seconds for the polynomial expansion and 9.8 seconds for the Monte Carl). Therefore, in this case, maybe it is better to use the Polynomial method: this approach gives similar results to the Monte Carlo one, but it is significantly faster.

We also tried to change the number N\_pol at which we truncate the polynomial expansion and the number N\_sim of simulations for the Monte Carlo method. If we increase N\_pol from 10 to 50 the time spent obviously goes up (to 36.5 seconds), while the price remains almost unchanged.