Introduction to Computational Physics - Exercise 2

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The code for this exercise sheet was written in a single program:

```
import numpy as np
import matplotlib.pyplot as plt


class Body:
    def __init__(self,mass,position,velocity):
        self.mass = mass              # mass of the body
        self.position = position      # inital position vector
        self.velocity = velocity      # inital velocity vector
```

2 Error Analysis of Euler Scheme

(a) After varying the inital velocity three times we can see that the duble logarithmic plot of the function is always a straight line with the same slope but different starting points. Therefore all the lines are parallel. This differs quite a lot from what we would expect. The law of conservation of energy predicts, that the energy in the system should remain constant. But we actually see that the

(b) Implementing the Leapfrog scheme...