

Numerical Methods

Homework 4

Due: Wednesday, May 8th, 11:00am
or per email on Tuesday to cpopov59@gmail.com

1. Inclined plane

An object moves on a flat smooth plane whose angle of inclination Θ changes with a constant rate

$$\frac{d\Theta}{dt} = \omega.$$

At time t the position of the object is given by

$$x(t) = \frac{g}{2\omega^2} \left(\sin(\omega t) - \frac{e^{\omega t} - e^{-\omega t}}{2} \right).$$

Use $x(1\text{s}) = 0.51\text{m}$ and determine ω with a least a precision of 10^{-5} .
($g = 9.81 \frac{\text{m}}{\text{s}}$)

Feel free to re-derive the equation for yourself.

2. Prime numbers

Write a program that determines the first n prime numbers and prints a suitably large subset on the screen. Use different values for n and observe how long the program runs. How many prime numbers can you find within a reasonable time (≈ 1 minute)?

In C/C++ the modulo operation is given by the %-Operator.