



Numerical Methods

Exercise Sheet 11

HS 16
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<http://www.physik.uzh.ch/en/teaching/PHY233/HS2016.html>

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Due: 14.12.2016 16:00

Exercise 1: Bisection method (20 Pts.)

Find a local minimum of the function $f(x) = x^3 + e^{-x} - x$ in the region $[0,1]$ with the precision $\varepsilon = 10^{-2}$ using a bisection method.

Exercise 2: Golden rule (20 Pts.)

Find a minimum of the function $f(x) = x^4 + 2x^2 + 4x + 1$ in the region $[-1,0]$ using the golden rule.

Exercise 3: Brent method (20 Pts.)

Find a minimum of the function $f(x) = -2x + \tan(x)$ in the region $[0.5,1.5]$ using a Brent's method.

Exercise 4: (40 Pts.)

Find a minimum of the function $f(x, y) = \frac{1}{2}(1 - x)^2 + \frac{1}{2}(y - x^2)^2$ in the region $|x| \leq 2, |y| \leq 2$:

- using a Gauss-Newton method; (20 points)
 - using a Levenberg-Marquardt method. (20 points)
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Maximum number of points for mandatory tasks on 14.12 : 100

Maximum possible number of points for tasks on 14.12 : 100