Laboratory Class 1

Group 1

Installation and configuration of an Interval Arithmetic Library of your choice.

- Octave: https://octave.sourceforge.io/interval
- Java: http://interval.sourceforge.net/interval/java/ia_math/README.html
- Python: https://pypi.org/project/pyinterval
- C++: https://www.boost.org/doc/libs/1_68_0/libs/numeric/interval/doc/interval.htm

Group 2 (see Lecture2.pdf)

Test the installed Interval Arithmetic Library

Consider the intervals $I1=[0,1]$, $I2=[2,3]$ and $I3=[-2,-1]$ and compute:

a) The left and right bounds of the intervals. (see page 10)
b) The center and width of the intervals. (see page 10)
c) $I1+I2$, $I2-I3$, $I1\times I2$, $I2/I3$ and $I2/I1$. (see page 13)
d) $I1\cap I2$, $I1\uplus I2$, $(I2\uplus I3)\cap(2I1)$ and $(I3)^3$. (see page 9)
e) $I1\times(I2+I3)$ and $I1\times I2+I1\times I3$. (see page 15)
f) Let $I1=[0.5,1]$, $I2=[2,2.5]$ and $I3=[-2,-1]$ and compute again e). (see page 15)

Group 3 (see Lecture2.pdf)

Consider the interval expressions $X1-X1^2$, $X1\times(1-X1)$ and $0.25-(X1-0.5)^2$.

a) Evaluate each expression with $X1=[0.5,2]$. (see page 25)
b) For each expression, evaluate with $X1=[0.5,1.25]$ and with $X1=[1.25,2]$, and compute the union hull of the results. (see page 26)