Advanced mathematical environments

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Prepared for lectures in "Selected Topics in Computer Science" as a part of Computational Engineering MSc program at Civil Engineering Faculty, Cracow University of Technology

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Mathematical software

Mathematical software is software used to model, analyze, or calculate numeric, symbolic, or geometric data.(wikipedia)

Application areas:

- ▶ Symbolic mathematics – computer algebra systems
- ▶ Statistics
- ▶ Geometry
- ▶ Numerical analysis

Categories of software:

- ▶ applications, e.g. GeoGebra
- ▶ interactive platforms, e.g. Scilab, Sage
- ▶ problems solving environments (PSE), e.g. Diffpack
- ▶ software libraries, e.g. GNU Scientitic Library, Trilinos

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Selected software packages

Alphabetical list:

- ▶ Diffpack
- ▶ Maple
- ▶ MathCad
- ▶ Mathematica
- ▶ Matlab
- ▶ Maxima `http://maxima.sourceforge.net/`
- ▶ Octave `http://www.gnu.org/software/octave/`
- ▶ R `http://www.r-project.org/`
- ▶ Sage `http://www.r-project.org/`
- ▶ Scilab `http://www.scilab.org/`

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Software taxonomies

Licensing:

- ▶ Open Source
- ▶ Propretiary

Scope:

- ▶ Symbolic computations
- ▶ Numerical computations

Operating mode:

- ▶ WYSWIG, GUI
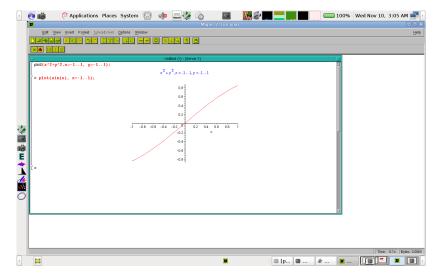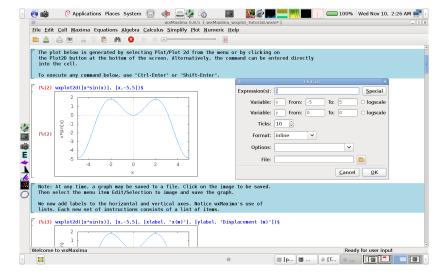- ▶ traditional programming, CLI

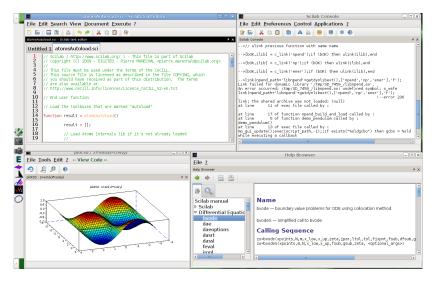Prepared for lectures in "Selected Topics in Computer Science" as a part of Computational Engineering MSc program at Civil
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Matlab

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Maple

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Maxima + wx = wxMaxima

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Scilab

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Octave

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Octave + Qt = QtOctave

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Sage

From Sage web page: "Sage is built out of nearly 100 open-source packages and features a unified interface".

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References

1. Maxima `http://maxima.sourceforge.net/`
2. R `http://www.r-project.org/`
3. Sage `http://www.r-project.org/`
4. Scilab `http://www.scilab.org/`
5. GNU Octave `http://www.gnu.org`
6. GNU Octave. A high-level interactive language for numerical computations, by John W. Eaton, David Bateman, Søren Hauberg, edition 3 for Octave version 3.0.2, Network Theory Ltd, 2008
7. Python `http://www.python.org/`
8. Own materials

Thank you for your attention

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