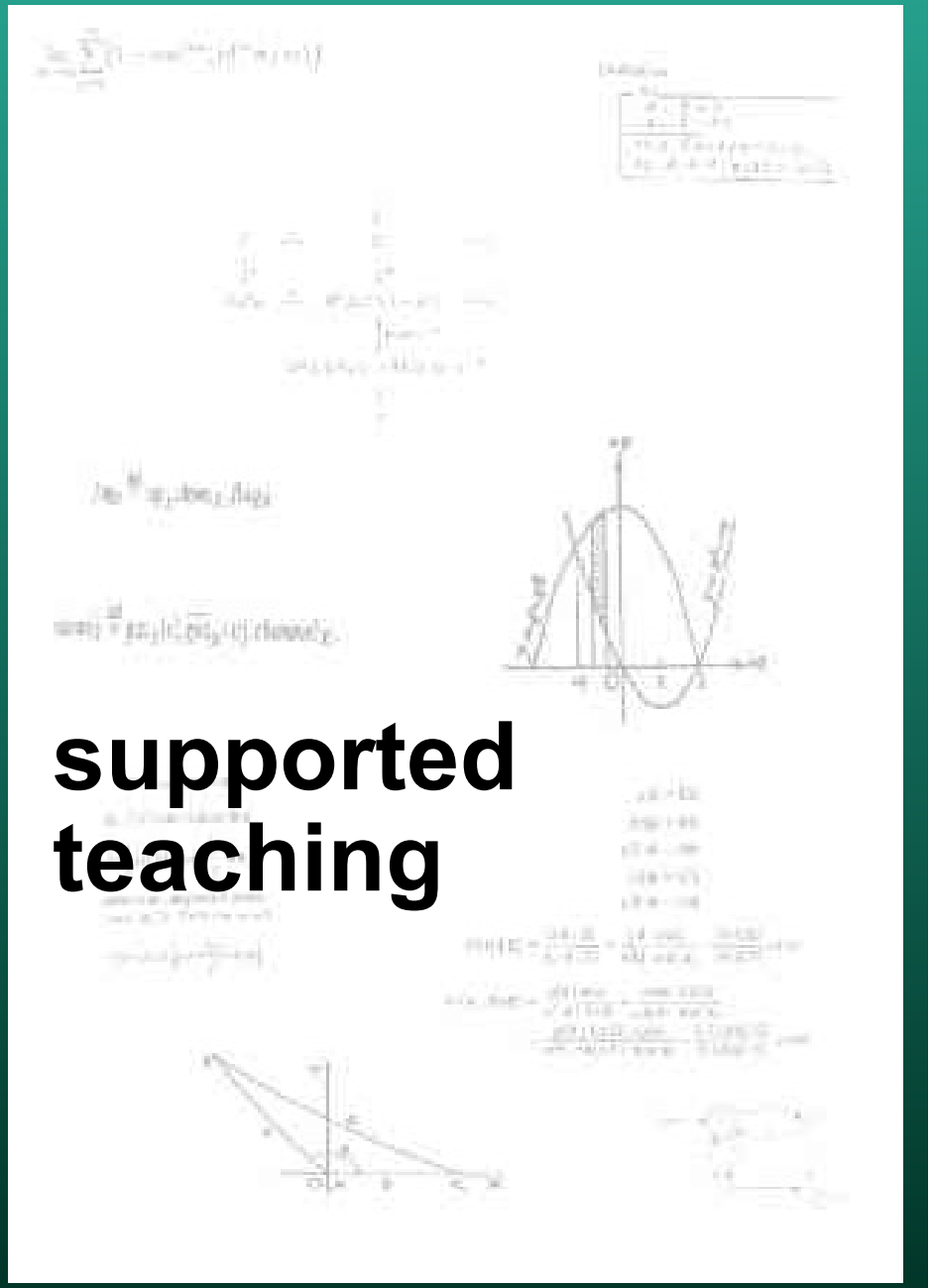
Tools for Technology supported teaching



Derive/TI-Nspire Summit II
Stockerau 2008

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Technology for Schools

Let's say for secodary level II

- What kinds of tools for school math?
- What kinds of interfaces?
- What kinds of help?
- Do we meet school reality?

Known tools

- Numeric calculator
- Graphic calculator
- Function plotter
- CAS
- Spreadsheet
- Dynamic Geometry
- Programming tools
- ...

Transformation

- to multi-representation tools
- to multi-purpose tools
- to edu-tools

- Expression-Manipulator
- Equation-Solver
- Plotting-Tool
- Geometric-Tool
- Stochastic-Tool
- Calculus-Machine
- Algorithmic-Tool

Tools for school math

Expression-Manipulator

- Determining whether an action is performed on the whole expression or on a subexpression
- Extract, Factor, Expand
- Variable order
- Substitution
- User determined simplification
- Stepwise simplification
- Determining the form of a fraction
- Determining the form of decimal number
- Structure analysis of math expressions
- Determine variable domains

Equation solver

- Numeric solver
- Algebraic solver
- Graphic solver

Plotting Tool

- Plotting, zooming, tracing points (2D, 3D)
- Plotting, zooming, tracing sequences (2D, 3D)
- Plotting, zooming, tracing functions (2D, 3D)
- Plotting, zooming, tracing curves - Implicit plotting
- Plotting vectors
- Plotting slope and direction fields
- Plotting figures and pictures (sketches)
- Scatter plots
- Statistic plots
  - Histogram, box plot, ...
- Using and mixing different coordinate systems
  - cartesian, polar, (spherical)

Geometric-Tool

- Dynamic geometry
- As narrow interaction between algebraic and geometrical representation as possible
- Interaction between geometrical objects, functions and curves

Stochastic Tool

- Random Functions
- List operations
- Spreadsheet functionality
- Statistic Calculations
  - Distributions
  - Confidence Intervalls
- Test functions

Calculus-Machine

- Sums, Products
- Limits
- Zeros
- Differentiation (explicit, implicit)
- Integration
- Series
- Differential equations

Algorithmic Tool

- Implementation of elementary algorithms
- Expanding functionality in form of modules
- Collecting several geometrical steps in form of macros
- “Iteration machine” for performing iterativ or recursiv operations