Keynote Presentations

Rob Corless (rcorless@uwo.ca)
Department of Applied Mathematics, University of Western Ontario,
London, Ontario, Canada.

Computer-Mediated Thinking

Most people agree that the best old-fashioned kind of education taught people to think. Perhaps some people disagreed on what, exactly, that meant, or just how to do it, but on the whole, it was considered a good thing to be able to use your brain for something more than just providing a place to hold your hat. But that was old-fashioned education, and nowadays many (if not all) scientists, mathematicians, and even artists use computational aids to help them in their work. The best use of such computational aids (in my opinion) is not as a substitute for thought (Garbage In, Gospel Out) but rather as an aid to thought: I call this process "Computer-Mediated Thinking". It has become widely recognized in the past twenty years that this change in how people think has both enabled and necessitated a change in how people are educated. In this talk I will try to expose some interesting subtleties of these changes, from the point of view of someone who routinely uses computers to mediate his thinking and who has, for the past fifteen years, participated in a large-scale experiment in attempting to use technology in education at the first year University level.

corless.pdf

Helmut Heugl (hheugl@aon.at)
Vienna University of Technology, Institute of Discrete Mathematics
Stockerau, Austria

The Influence of Technology in Several Roles of Mathematics

Studying the history of mathematics you can recognize that tools have always fundamentally influenced the development of mathematics. The computer, a child of mathematical thinking, has changed the several roles of mathematics as well as the ways of teaching and learning mathematics. In my lecture I will formulate my thesis concerning the influence of technology by using four roles which mathematics can have:

Mathematics - the technique of problem solving by reasoning.
Mathematics - a "two phase" process: the abstract phase and the concrete phase.
Mathematics - a language. Mathematics - a thinking technology.

Using these four roles of mathematics I will give concrete examples for some of the changes caused by the use of technology:

A more pupil centred, experimental way of learning with a shift of emphasis from operating to modelling and interpreting.
Technology supports both phases of mathematical activity - the abstract and the concrete phase.
The use of technology allows the students to create new language elements.
The use of technology not only supports cognition - it becomes part of cognition.

heugl.pdf heugl.ppt

Peter Jones (pjones@swin.edu.au)

Swinburne University of Technology, Hawthorn,
Victoria, Australia.

CAS and the teaching and learning of mathematics: towards the intelligent partnership

Technology has always played a role in the mathematics classroom whether it be pencil and paper, tables of logarithms or more recently electronic calculators or computers. Furthermore, the introduction of a new technology has always presented a challenge for teachers of mathematics. Of these technologies, the cheap handheld CAS is the latest and perhaps the most challenging of all. In this presentation we will look back at the way that technology has been used in the past, compare the old technologies with the new, and from this analysis, develop a framework for thinking about the potential role of CAS in the mathematics classroom of both today and tomorrow.

Eugenio Roanes Lozano (eroanes@mat.ucm.es)

Universidad Complutense de Madrid, Dept. Algebra
Madird, Spain

Pictures at a DERIVE´s exhibition (Interpreting DERIVE`s SOLVE command)

General non-linear polynomial system solving defied mathematicians for many years. Approximate methods were the only alternative until the sixties, when the first general and effective method was found (Gröbner bases method). Although implementations of Gröbner bases' algorithm are incorporated to all Computer Algebra Systems, they are only known to a small number of members of the scientific community, most of them mathematicians. Although non-linear polynomial system solving is many times a huge task, there are situations where an exact solution is needed. We present an elementary introduction to the geometric interpretation of DERIVE's SOLVE command for polynomial equations and systems.

roanes.pdf

DERIVE-file roanes.mth

MAIN

Theresa Shelby (tshelby@ti.com)

Texas Instruments
Honolulu, Hawaii, USA

Looking in the Derive Window (A Designer´s View)

Derive™ 6 for the Windows™ operating system is the most recent evolution of the Derive user interface. This presentation will review the progression from Derive 4 in light of the following challenges: adherence to user interface design guidelines; addition of new features while maintaining simplicity; trade-offs in meeting user requests; and simultaneous software releases in multiple languages. With an updated systems architecture diagram as a baseline, we will explore the major interface components and process flow of several Derive features. Topics such as expression entry, plotting, interconnectivity with TI CAS calculators, and "Display Step" will be illustrated.

shelby.pdf

shelby.ppt

DERIVE 6-file shelby.dfw

The Derive session as document shelby.rtf

(You might need to install the Derive 6 fonts in order to read all the mathematical expressions properly. You can find the fonts in folder \time_soft\fonts.)