The ISAC-Project
History, State and Future
Introductory Presentation at IICM

Walther Neuper

Institute for Computer Media (IICM)
Graz University of Technology

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1 History and Aims of the ISAC-Project
   History
   Aims

2 State: Prototype of an Educational Math Assistant
   Advantages of CTP-Technology
   Brief Demo of ISAC-Prototype
   Promising R&D on Human-Computer-Interfaces

3 Future: Plans for R&D and Dissemination
   Projects under Construction
   Field Tests envisaged
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Brief History of the ISAC-Project

- 1992–93 MacSchubert-Project (UNU/IIST & bmukk)
- 1994–99 feasibility studies: IST/TUG (Lucas) & RISC/Linz (Buchberger) & (Neuper)
- 2000–03 ISAC-math-engine in Isabelle ¹ + SML
- 2001–07 ISAC-front-end in JavaSwing
- 2006–08 field tests at schools (IMST)
- 2008–11 initiatives for workshops (CADGME, CADE, CICM)
- 2011—... ISAC-math-engine at RISC Linz, ?ISAC-front-end at IICM?

¹“Isabelle” is one of the 2 Computer Theorem Provers dominant in EU
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3 Activities in math education

Math learning / teaching

- explanation
- exercise
- maturation
Aims of the ISAC-Project

- R&D on an educational math assistant ISAC \(^2\)
  - which addresses all 3 activities . . .
  - by integrating *explanation* and *exercise* and
  - by covering age 12 years to university courses (*maturation*)
  - which supports stepwise problem solving . . .

NEW . . . by mechanizing the solving process as a whole in CPT-technology (CTP = Computer Theorem Proving)

- Promote interdisciplinary R&D between
  - Computer Mathematics: CTP-based technology; initiated workshop at CADE, CICM
  - HCI: dialog design, user modeling, usability; contributed to CAVE etc
  - Educational Science; initiated workshop at CADGME

\(^2\)Isabelle for Calculations in engineering & science.
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Requirements for tutoring

The general requirements are basically: ZU TECHNISCH !!!

1. Check user input as generous as possible . . .

2. Guide the user step by step towards a solution . . .

3. Explain steps on request by the user . . .

. . . during the stepwise *construction* of the solution of some problem in applying mathematics (incl. geometry).
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Further ideas ?

Objections ?

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