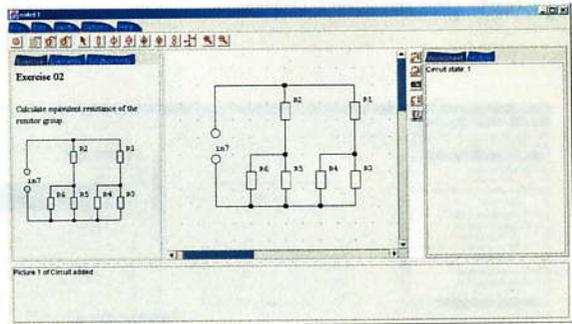


# Intelligent Problem Solving Environment

Intelligent Problem Solving Environment mileET belongs to the class of constructivistic learning environments based on ISP-DL-Theory (Impasse-Success-Problem-Solving-Driven-Learning), a cognitive meta-learning theory.

IPSE mileET should help the student to acquire procedural knowledge from the domain of principles of electrical engineering.



The system offers a set of domain relevant tasks. The adaptive help is created by a knowledge based assistant. This assistant is able to solve the tasks and to analyse the students' proposals. Therefore, it is able to respond adaptively to students' hypotheses.

## Contact

mileET@offis.de

### Team:

- Prof. Dr. Claus Möbus<sup>1,3</sup>
- Prof. Dr.-Ing. habil Edwin Wagner<sup>2</sup>
- Dipl.Inform. Hilke Garbe<sup>1</sup>
- Dipl.Ing. Vera Yakimchuk<sup>1,2</sup>
- Jan-Patrick Osterloh<sup>1</sup>
- Heinz-Jürgen Thole<sup>1</sup>
- Lars Weber<sup>1</sup>



www.offis.de

1. Kuratorium OFFIS e.V.  
R&D Division Safety Critical Systems  
Escherweg 2,  
26121 Oldenburg, GERMANY



www.tu-ilmenau.de/~getsoft

2. Technical University of Ilmenau  
Faculty of Electrical Engineering and Information  
Technology  
Institute of General Electrical Engineering  
PF 100565, 98684 Ilmenau, GERMANY



ils.informatik.uni-oldenburg.de

3. Carl von Ossietzky University Oldenburg  
Department of Computing Science  
Learning Environments and Knowledge-based  
Systems  
26111 Oldenburg, GERMANY



# IPSE mileET

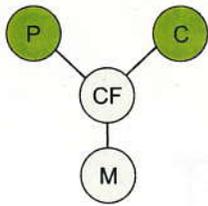
## Intelligent Problem Solving Environment for Principles of Electrical Engineering

01. SEP. 2003

mile is financed by BMBF (German Federal Ministry for Education and Research)

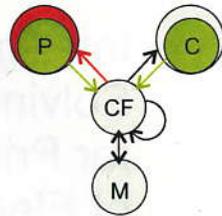
# Task and Knowledge Modeling

## Task Modeling



In mileET supported tasks can be understood as relations over the sets of circuits (C), parameters (P), mathematical equations (M), and concepts and formulas (CF).

The sets P,C and M can be derived from each other by the application of concepts CF. This derivation represents the task solving process of an expert and can be produced in our IPSE by means of gmr.



## Knowledge Modeling

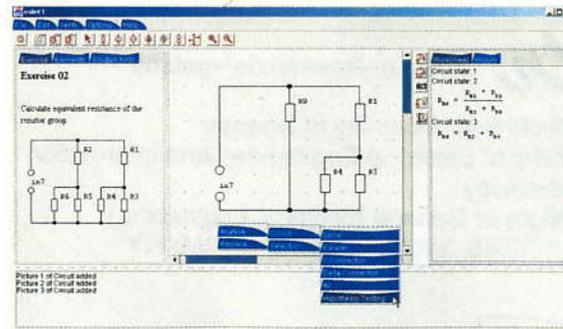
The essential electrical engineering knowledge is represented in the mileET knowledge base by means of goals-means-relations (gmr). In order to get many possible solutions the gmr-rules are very fine grained. They can be combined to get a great number of different solutions, also "unusual" ones. Owing to GMR the system is able to examine hypotheses of the students and to complete solution drafts if possible if necessary.

# Working with mileET

A special teacher mode enables teachers to prepare new tasks based on the CF from mileET.

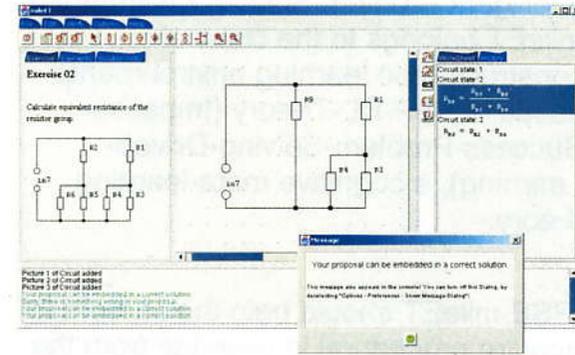
These special formatted tasks (\*.xml) can be loaded in mileET. The worksheet contains the initial state of the task.

Solving the task, the student can transform the circuit and copy the different circuit states into the worksheet. He can write formulas and annotations, too. The worksheet with the learner's solution proposal can be saved.

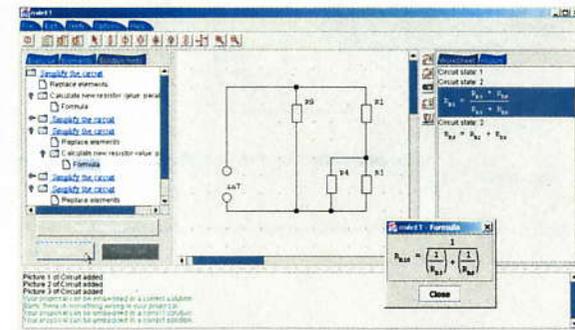


The student may ask the system for evaluation of his proposal even if this proposal is incomplete.

# Hypotheses Testing and Adapted Help in mileET



The correctness of a hypothesis is proved by comparing the student's solution with system generated ones.



The system gives positive feedback only if the hypothesis can be embedded in a correct solution. In this case the solution trace completing the user's proposal will be given. If the student lacks declarative knowledge, he can start the web-based learning modules of the partner