

OpenMath Workshop, Eindhoven  
16th June 1999

# Using OpenMath to communicate between CATHODE II packages

Matthias Berth — Greifswald (DE)  
Frank-Micheal Moser — Greifswald (DE)  
Arrigo Triulzi — Queen Mary and Westfield (UK)

# Introduction: what is CATHODE II

- European Workgroup under the Esprit initiative,
- Aims to develop algorithms for the solution of ODEs and PDEs,
- Uses a variety of Computer Algebra packages: Maple, REDUCE, Mathematica, Aldor,
- Web demos of developed packages,
- Need for a common demonstrator for the final EU report.

# History: Before OpenMath

The long and tortuous route to our decision to use OpenMath:

- 9/1997 (Workshop): plan to use file-based methods, OpenMath mentioned but discarded as “vapourware” ,
- 1/1998 (Software meeting): OpenMath mentioned again, once again discarded in favour of Aldor “stubs” ,
- 5/1998 (Workshop): Matthias and Arrigo develop example CD, nevertheless OpenMath rejected once again.

*OpenMath was not thought to be usable before the end of the CATHODE II Workgroup.*

# The Acceptance of OpenMath

1/1999 (Software Meeting): OpenMath is once again mentioned, this time Matthias has a demo based on NAOMI developed with Frank-Michael Moser, it is agreed that Matthias and Arrigo will produce a “proof of concept” for the Workshop,

5/1999 (Workshop): Matthias, Frank-Michael and Arrigo present a working demo of Mathematica calling `odesolve` under REDUCE over OpenMath *and receiving the result back*.

OpenMath is officially endorsed as our common inter-package communication system.

# The “Marseille Edition”

The “proof of concept” which we developed had to be based on a number of different packages:

- REDUCE: special OM version by Marc Gaëtano (1997/8 vintage),
- Mathematica: using special package by Matthias,
- Java: NAOMI library for server front-end and special client,
- Apache: alternative server front-end,
- Perl: “glue” and CGI scripts.

Fundamentally, OpenMath was *not easy* to use.

# Further Developments

Clearly the “Marseille Edition” could *not* represent a stable platform on which to base the CATHODE II communications layer.

We therefore decided the following:

- REDUCE: new implementation using CSL and OM C library,
- Mathematica: further development of OM package, possibly with MathLink,
- Java: extension of NAOMI and/or use of OM Java library,
- develop OM interfaces to Maple and Aldor.

Aim is to cut out the “glue” (Perl, Apache) and obtain a true OM client-server system.

# Conclusions

OpenMath is ideal for the integration aims of CATHODE II.

## **Problems:**

- OpenMath is not supported by CA systems,
- Very hard/impossible to obtain details and software,
- Concerns about stability of the standard,
- No Differential Expression CDs.

The ongoing development of OpenMath makes it hard for us to have a fixed development target.