Progress Report of the Work Package (ex-Project) on Mathematical Libraries: Mathlibs

Recall: **RTAG Recommendation 1** (5/2002)

"A support group should be designated to provide advice and information about the use of existing libraries, to assure their continued availability, to identify where new functionality is needed, and to develop that functionality themselves or by coordinating with other HEP-specific library developers. "

Progress

EP Div. has now created the SFT Group, of which a small part is devoted to Mathlibs, part of the SEAL Project.
Current Manpower:

30% of F. James + all of M. Winkler
Both of the above reach end-of-contract next year!

Recall: **RTAG Recommendation 2** (5/2002)

"The experiments should maintain a data base of mathematical libraries used in their software, and within each library, the individual modules used. This is in their own interest, since only in this way can continued support for these libraries be guaranteed."

Progress

There seems to be little hope that the experiments will set up such a complicated system,
but they do realize it when they have an unsatisfied need, and they communicate it to us.

Recall: **RTAG Recommendation 3** (5/2002)

"A detailed study should be undertaken to determine whether there is any functionality needed by the experiments and available in the NAG library which is not covered as well by a free library such as GSL. This is a big job which could be done by an outside group such as the Centre for Advanced Technology, Indore, India ... ."

Progress

Our colleagues from CAT did some good work, but it was not really what we wanted.
We are not pursuing that track.

The Current Situation

I. **Mathlibs:**

1. The big question is: **Can we replace NAG/C by GSL ?**
2. Indications from many sources, including the work of the Indian team, are that nearly all our foreseeable needs can be satisfied from existing GSL.
3. From time to time there arises a need which GSL does not meet. Then we do one of the following:
   - Ask GSL to modify/extend an existing functionality.
   - Write a new routine ourselves (perhaps by translating a CERNLIB routine to C) and submit it for inclusion in GSL.
   - Ask GSL to provide a new functionality (costs money).

4. Matthias is spending about half his time on support of CLHEP and GSL.

5. From time to time we may carry out special projects to improve the use of Mathlibs.
   This year a summer student, Erik Myklebust, produced a nice report:
   A Comparative Study of Numerical Linear Algebra Libraries in the Context of Particle Track Reconstruction.

II. The Minuit to C++ Project

Matthias is doing a great job, but is only about half-time on Minuit.
He is working with Paul Kunz and others to get the OO Design right.
He is working with me to get the functionality and the numerical part right.
A working prototype with reduced functionality is installed in the SEAL area and is already being used by CMS and others.
There is considerable demand for the final product.
We hope it will be finished before we both reach the ends of our contracts.

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The most-accessed web pages in the SEAL area
September 2003.
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   1282 style.css
    390 index.html
    354 main/relnotes.html
    131 work-packages/mathlibs/minuit/layout.css
    129 work-packages/mathlibs/minuit/LCGlogo.jpg
    128 work-packages/mathlibs/minuit/tutorial/mntutorial/mntutorial
    109 apiref/index.html
     61 main/components.html
     59 work-packages/mathlibs/index.html
     56 work-packages/mathlibs/minuit/index.html
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CERN