Library for the Interactive Study of Mathematics

James E. White and Ladnor D. Geissinger

University of North Carolina - Chapel Hill
300 Bynum Hall 008a
Chapel Hill, NC 27514
jimw.iat@mhs.unc.edu

Grant Number: DUE–9551273

The problem this proposal addresses is how to use the new information technologies, and in particular, the World Wide Web on the Internet, to make new tools available to teachers, and, through the teachers’ productive use of those tools, to enrich the quality of mathematics instruction at the undergraduate level, to widen the range of instruction to include larger sectors of the student population, and to expand pedagogy with new technology-supported styles of teaching and learning. Specifically, there is a need to make interactive materials that already exist easily available so as to encourage more teachers to experiment with the materials, to extend them, and finally to create new materials that are more sharply focused on the level and the abilities of their own students.

The proposal is to build, over the course of two years, a Library for Interactive Study of Mathematics on the World Wide Web. This will be an Internet based library of interactive workbooks on topics commonly encountered in undergraduate mathematics. That is, it would cover topics from college algebra and precalculus through multivariable calculus, differential equations, and mathematical modelling. This library would make available to instructors all over the country a wide variety of interactive workbooks that they may freely use and distribute to their students. This means that workbooks, together with the program necessary to read them, will be provided instantly, and free of charge, over the Internet to any teachers who desire to have them. As initial stock for the library, the directors will provide 45 of the most effective experimental workbooks created by teachers during the last three years at workshops of the MAA-sponsored Interactive Mathematics Text Project (funded by IBM and NSF). Initial NSF support for that project came from the 1992-3 NSF ILI-LLD grant: Establishing Regional Sites for the Dissemination of Computer Based Laboratory Materials in Mathematics (USE-9150272).

The plan is to disseminate widely among instructors information about the library, about its contents and about learning with interactive workbooks. Information will be disseminated electronically via email and discussion lists, and the project directors will do presentations and workshops to show teachers what can be done, to get them interested in experimenting, and for those who are motivated enough, to teach them how to build their own interactive workbooks. Collaborators will be solicited to help build the library from a consortium of colleges that have already said they are interested in participating, and others will be invited to join. There is a core group of 8 productive and knowledgeable authors in these colleges who are interested in working on this project, and the directors will provide both software and workshop instruction to prepare 16 new teacher/authors to contribute to the library. In order to refine and focus the library collection, the materials will be used in teaching and their effectiveness assayed at the consortium test sites, and feedback from an editorial board will be directed to the authors. The project will be based at the Institute for Academic Technology of the University of NC at Chapel Hill.