

COMPUTING WITH GENERALIZED NUMBER SYSTEMS USING THE COMPUTER ALGEBRA SYSTEM SYGNM

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Abstract

As computational methods become increasingly important in scientific research and education there is a high demand for all kinds of mathematical software. Computer algebra systems aim to provide both symbolic and numerical capabilities covering a wide range of mathematical topics. The development of some of the most widely used computer algebra systems has begun over 30 years ago, which means that these systems are outdated in some aspects and do not fully take advantage of new technologies and software engineering methods that appeared since then. A new, general purpose computer algebra system architecture and its implementation is presented which aims to fix several problems of current systems. Part of this new system is a built-in package for computations with generalized number systems, containing functionality which is not found in other computer algebra systems. The number systems package is efficient and well integrated into the general purpose computer algebra environment, however it is also available as a separate C++ library. The current capabilities of the number systems package and plans for future number system related developments are presented. Both the new computer algebra system and the generalized number systems library will be released as open source software.

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