

# Global application of CAS tools for teaching in Computer Engineering degrees

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## **Abstract**

In Engineering degrees, the use of CAS tools must be integrated as an educational tool that will have a professional use in the future, that is, they have to be something more than class usage within a subject. In this paper, we present the experiences of a group of teachers of the Applied Mathematics area at Málaga University teaching in Computer and Engineering degrees. An integral program of training, use and creation of free software of Mathematics for the students is developed. CAS tools are used in the subjects of the first course as habitual tool of work. The formation in CAS is carried out by means of a on-line subject that introduces the basic managing of several programs of Mathematics (Maxima, Octave, SciLab, R, Sage, Geogebra, ...). Some advanced applications of the use of these programs are introduced in the subjects. Also, the creation of open sources software and development of CAS tools for complete applications or modules for other programs are developed (development of routines of symbolic calculation, cross-platform environments, web for free software, applications for mobile devices, ...).

## **Keywords**

CAS tools, on-line training, open sources software