11 Years of Master Theses in Engineering using DERIVE in the University of Málaga

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ABSTRACT

The development of a master thesis (MT) is a must for students of Engineering in Spain (as in many other countries along the world) in order to obtain their Degree. The main purpose of a MT is the development of a personal work by students where they can apply and integrate their knowledge (theoretical and technical) acquired along the Curriculum and also to foment their capacity for creativity and originality. In a MT one or two teachers must participate acting as advisors. The main topics chosen by students for developing their MT are directly related with applications of their studies to a specific purpose.

We will present the MTs developed using DERIVE in different Engineering Degrees in the University of Málaga in which at least one of the authors of this lecture has been the advisor. We will present chronologically these MT which will also lead to show the evolution in the use of the software DERIVE: from our old friend, the DERIVE 3.13 MS-DOS version, to DERIVE 6.1 and its integration in a JAVA environment or its use as a PECAS (Pedagogical Computer Algebra System).

Specifically, we will present the MTs developed using DERIVE for topics as Multiple Integration, Complex Analysis, Discrete Mathematics, Graph Theory, Automatic Theorem Proving for Classical Logic, Probabilistic Logic, Statistics and even Contrapuntal Musical Compositions. We will also present the MTs which are now in development such as a Numerical Analysis course, a Math Bachelor course and different extensions of previous works by means of using DERIVE 6.1 as a PECAS. These MTs have been the foundations for many lectures developed in previous TIME and other Conferences and for different papers published in specialized Journals.

Finally, it is our hope to develop a very important project which would consist in the developing of a friendly environment which can translate DERIVE to other actual software such as MAXIMA. This will be done by integrating different future MTs and with the main goal of being able to use the work developed in DERIVE in other software.

Keywords

DERIVE, Master Thesis, Computer Algebra System (CAS), Pedagogical Computer Algebra System (PECAS), Engineering Syllabus.