

TEACHING MULTIPLE INTEGRALS AND ITS APPLICATIONS USING DERIVE 6 AS A PeCAS

Gabriel Aguilera, José Luis Galán, M. Ángeles Galán, Antonio Gálvez,
Antonio J. Jiménez, Yolanda Padilla, Pedro Rodríguez
University of Málaga, Spain.
jl_galan@uma.es

In this talk we will describe the file `MULTIPLE_INTEGRALS.MTH`, created in DERIVE 6 in order to be used in subjects that deal with double and triple integrals, aimed at Engineering students. Such file contains a series of programs which permit to solve multiple integrals problems.

The programs contained in the file can be grouped within the following blocks:

- Double integration (in Cartesian, polar and other coordinates).
- Triple integration (in Cartesian, cylindrical, spherical and other coordinates).
- Applications of multiple integrals: Green-Riemann's theorem, surface integrals, area of a surface, flux, Gauss' theorem (the programs developed for all these applications make use of different coordinate systems).

We will also show in the talk some examples of applications that have been carried out with our students of Telecommunication Engineering.

The programs have been developed using the *Display* function in order to be used as didactical tools with explications of what the programs do step by step (using DERIVE 6 as a PeCAS or as a white-box CAS).

Finally, we include the conclusions obtained after using this file with our students and also some future work on this subject.