

TEACHING LINE 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 `LINE_INTEGRALS.MTH`, created in DERIVE 6 in order to be used in subjects that deal with line integrals, aimed at Engineering students. Such file contains a series of programs which permit to solve line integrals problems.

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

- **Parametrization of curves and their plots:** Segment, Circumference, Ellipse, Lemniscata, Astroid, EllipticalAstroid, Cardioid, Catenary, Cicloid, Cisoid, DescartesFolium, EightFigure, PascalSnail, Rosacea, Folium, Hipocicloid, Trisectriz, Tractriz, ArchimedesSpiral, Astroid3D, SphericalSpiral, VivianiCurve, HelicoidalCurve.
- **Exact differential form.**
- **Potential function.**
- **Line integral.**
- **Line integral with respect to arc length.**
- **Applications of line integrals:** (AreaInsideCurve, CurveLength, WireMass, WireMx, WireMy, WireMxy, WireMxz, WireMyz, WireMassCenter, WireInertiaMoment, MediumValue).

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.