



Propuesta de Trabajo Fin de Grado en Física

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Título del Trabajo: MAGNETIC MOMENT OF PERMANENT MAGNET MEASUREMENT WITH FITTING METHODS.

Tipología del Trabajo: Teórico - práctica

Breve descripción del trabajo:

A new procedure for magnetic moment measurement [1,2], utilizing single sensitive magnetometer and linear table will be developed. A permanent magnet under test, will be positioned with its main axis along the sensitive axis of the 3D magnetometer's moving probe, and the magnetic field strength is recorded, as well as the probe precise position. The results of measurement will be then processed in the MATLAB or Python software, and the non-linear least squares curve fitting is done using the LSM or Levenberg–Marquardt algorithms [3]. The fitting will be performed for the magnetic dipole magnetic field strength versus distance model. Thus it is possible to measure both the object's magnetic moment and distance from the magnetometer.

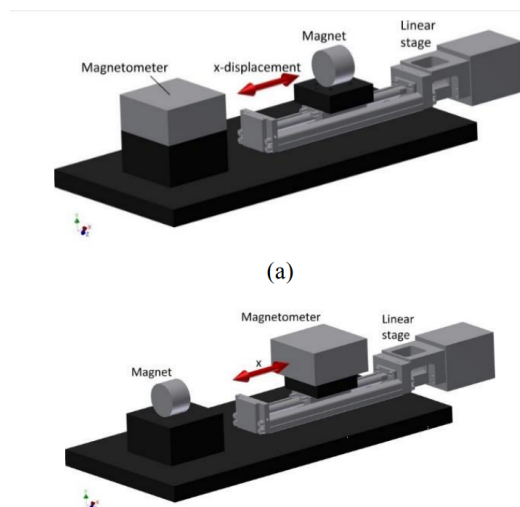


Figure 1. Magnetic setup for the measurements

The magnetometer and magnet setup for magnetic moment measurement is depicted in Figure 1.

All the measurements and algorithm development will be done in the Aerospace Electronic Group – GranaSAT in the UGR.

Objetives:



The work planning for the Bachelor's thesis can be resumed within:

1. Reading previous Bachelor's Theses available in the [Digibug](#).
2. Calculate magnetic density field of a permanent magnets, simulate the same scenario and compare values.
3. Build up a measure platform and compare the simulated with the measurement values obtained.
4. Process in the MATLAB or Python software the measurements and do the non-linear least squares curve fitting using several algorithms.

Methodology:

The student will start his work Reading the information available for this development. An introduction to MATLAB will be made inside the GranaSAT group. Advanced skill students will be able to Python for all the calculations. All the information and documentation will be uploaded to the GranaSAT GITLAB account in order to be easily supervised.

Bibliography:

- [1] [ECSS-E-ST-20-07C](#)-Rev1 - 7 February 2012.
- [2] [Magnetic Moment easy measurement](#).
- [3] [Magnetic moment of permanent magnet measurement with nonlinear least squares fitting method](#). Michał Nowicki, Dorota Jackiewicz, Roman Szewczyk. Journal of ELECTRICAL ENGINEERING, VOL 66. NO 7/s, 2015, 54-5

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Selected Student: Pablo García Bas

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