

**DOMAIN WALL DYNAMICS AND EQUIVALENT CIRCUITS
IN FERROMAGNETIC MATERIALS**

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ABSTRACT

The study of magnetic properties of ferro and ferri-magnetic materials has shown that, due to their different time constants, magnetisation mechanisms (domain wall displacement, spin rotation and wall bulging) can be separated; by using the complex permeability formalisms, they exhibit characteristic features in μ' versus μ'' plots. In many cases, the elements (inductances, resistances and capacitances) of the equivalent circuit representing the frequency behaviour, can also be associated with physical parameters of the sample [1-3].

In a different approach, domain wall dynamics can be represented by a motion equation with mass, damping and restoring force terms [4]. In this paper, we show that these two approaches are consistent and how they are related.

[1] JTS Irvine, E Amano and R Valenzuela. *Mater. Sci. & Engin.* **A133** 140 (1991)

[2] R Valenzuela, JTS Irvine and AR West. *J. Magn. Magn. Mater.* **104-107** 395 (1992)

[3] R Valenzuela and JTS Irvine. *J. Appl. Phys.* **72** 1468 (1992)

[4] See, for example: E.M. Gyorgy. *Treatise in Solid State Chemistry: The defect magnetic properties*. Ed: N.B. Hannay, p.429 (1975).