FRIDAY, September 1, 2000

CNA/MATH COLLOQUIUM: 4:30 P.M., WeH 7500, *Augusto Visintin*, Universita' degli Studi di Trento, Dipartimento diMatematica, Trento, Italy.
TITLE: "Quasilinear Equations with Hysteresis"
ABSTRACT: Let $\mathcal{F}$ be a hysteresis operator, and A a second order elliptic operator. The following equation arises in elasto-plasticity, ferromagnetism, ferroelectricity:

$$\frac{\partial^2}{\partial t^2}[u + \mathcal{F}(u)] + Au = f. \tag{1}$$

For $\mathcal{F}$ equal to a (possibly discontinuous) scalar Preisach operator, existence of a solution is proved for an associated initial- and boundary-value problem. Processes in ferromagnetic metals and in ferromagnetic insulators can be represented by the following vector equations, respectively,

$$\frac{\partial}{\partial t}[\vec{H} + \vec{\mathcal{F}}(\vec{H}) + \nabla \times \nabla \times \vec{H} = \vec{f}, \tag{2}$$

$$\frac{\partial^2}{\partial t^2}[\vec{H} + \vec{\mathcal{F}}(\vec{H})] + \nabla \times \nabla \times \vec{H} = \vec{f} \tag{3}$$

(here written with normalized coefficients).
Existence of a solution is proved for an initial- and boundary-value problem associated to (2), for $\vec{\mathcal{F}}$ equal to a (possibly discontinuous) vector estension of the Preisach operator.
A similar result is proved for (3), for a smaller class of (discontinuous) hysteresis operators.