Andreu, F.; **Mazón, J. M.**; **Segura de León, S.**; **Toledo, J.**

Quasi-linear elliptic and parabolic equations in L^1 with nonlinear boundary conditions. (English) Zbl 0882.35048

Adv. Math. Sci. Appl. 7, No. 1, 183-213 (1997).

Let Ω be a bounded domain in $\mathbb{R}^N$ with smooth boundary $\partial\Omega$. Under classical assumptions on the vector valued function a, the authors use variational methods to deduce the existence and uniqueness of solutions to the problem:

$$u - \operatorname{div} a(x, Du) = f \quad \text{in } \Omega, \quad -\partial u/\partial \eta_a \in \beta(u) \quad \text{on } \partial\Omega,$$

where β is a maximal monotone graph in $\mathbb{R} \times \mathbb{R}$ with $0 \in \beta(0)$ and $f \in L^1(\Omega)$. They introduce completely accretive operators and characterize the closure of the smaller one by introducing the notion of entropy solutions [*Ph. Benilan*, *L. Boccardo*, *T. Gallouët*, *R. Gariepy*, *M. Pierre*, and *J. L. Vazquez*, Ann. Sc. Norm. Super. Pisa, Cl. Sci., IV. Ser. 22, 241-273 (1995 Zbl 0866.35037)].

Reviewer: P.W.Schaefer (Knoxville)

MSC:

35J65 Nonlinear boundary value problems for linear elliptic equations
35R70 PDEs with multivalued right-hand sides
35J20 Variational methods for second-order elliptic equations
35K60 Nonlinear initial, boundary and initial-boundary value problems for linear parabolic equations

Keywords:

maximal monotone graph; completely accretive operators; entropy solutions