Fakultät für Mathematik universität wien

EINLADUNG

Mathematisches Kolloquium

"Compactness and Structural Stability of Nonlinear Flows"

Prof. Dr. Augusto Visintin
(Università di Trento)

Zeit: Mittwoch, 17. Juni 2015
13.30 Uhr Kaffeejause,
14.00 Uhr Vortrag

Ort: Fakultät für Mathematik,
Oskar-Morgenstern-Platz 1,
Sky Lounge

Ulisse Stefanelli
Harald Rindler

Compactness and Structural Stability of Nonlinear Flows

AUGUSTO VISINTIN

Dipartimento di Matematica – Università di Trento
via Sommarive 14 38123 Trento, Italia

Visintin@science.unitn.it

After Fitzpatrick's seminal work [1], it is known that in a Banach space V any maximal monotone operator $\alpha : V \to \mathcal{P}(V')$ may be given a variational representation, even if α is no subdifferential. This leads one to the formulation of *null-minimization problems*, that are here illustrated on some examples.

On this basis, De Giorgi's notion of Γ-convergence may be applied to the analysis of monotone inclusions. Via Fitzpatrick's theory, compactness and structural stability of the Cauchy problem

$$\frac{du}{dt} + \alpha(u) \ni h \quad \text{in } V', \text{ a.e. in }]0,T[, \qquad u(0) = u^0$$

is also studied, with respect to variations not only of the datum $h \in L^2(0,T;V')$, but also of the operator α. See [2,3].

These results may be extended in several directions, e.g., the operator α may be assumed to be generalized pseudo-monotone. In this way one may also address the Cauchy problem for doubly-nonlinear parabolic inclusions of either form

$$D_t \partial\varphi(u) + \alpha(u) \ni h \qquad \text{or} \qquad \partial\varphi(D_t u) + \alpha(u) \ni h,$$

with α maximal monotone and φ convex and lower semicontinuous.

References

[1] S. Fitzpatrick: *Representing monotone operators by convex functions.*, Workshop/Miniconference on Functional Analysis and Optimization (Canberra, 1988), 59–65, Proc. Centre Math. Anal. Austral. Nat. Univ., 20, Austral. Nat. Univ., Canberra, 1988.

[2] A. Visintin: *An extension of the Fitzpatrick theory.* Commun. Pure Appl. Anal. 13 (2014), 2039–2058.

[3] A. Visintin: *Variational formulation and structural stability of monotone equations.* Calc. Var. Partial Differential Equations 47 (2013), 273–317.