On stability and sensitivity of constraint and variational systems

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In post-optimal analysis and in the treatment of the so-called equilibrium constraints one often needs to analyze local stability of the *solution maps* which assign some parameters (e.g. problem data) the respective solutions (optima or equilibria). One of the most important local stability notions is the Aubin (Lipschitz-like) property which ensures that the perturbed problems

(i) do possess a solution, and

(ii) the distance of this solution from the original (reference) solution is bounded above by a multiple of the norm of the perturbation.

In the lecture, a new non-restrictive sufficient condition for the Aubin property will be presented in the general framework of implicitly defined multifunctions. In this development our main tool are generalized derivatives and coderivatives which provide a convenient description of the local behavior of nonsmooth and set-valued mappings. In particular, it is the *directional limiting coderivative* due to H. Gfrerer, which is tailored to fine local analysis of multifunctions along specified directions.

This new condition will then be specialized to constraint and variational systems having a frequently arising structure, which requires a development of a certain calculus for the directional limiting coderivatives. We will present one rule of this new calculus generalizing a formula due to Dontchev and Rockafellar. The advantages of this new approach will be illustrated by examples. The lecture is based on a joint work with Helmut Gfrerer (Johannes Kepler Universität Linz).