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Limits of invertible Sobolev functions: Links, currents and their convergence

There are many areas of mathematical analysis, in which the natural objects to study are in the class of homeomorphisms. At the same time, the natural notion of convergence is that of Sobolev functions. Thus understanding weak and strong closures of that class and their behaviour has been a question of long-standing interest.

This talk will first summarize the current state of the art of the topic with a focus on its connection to the mapping degree in form of the so called INV-condition. We will then reinterpret that condition by going back to De Rham's original notion of currents and follow it up to give an extremely natural definition of the linking number, connecting old and new ideas to several famous results along the way. This in turn will then be employed to show how weak and strong closures differ in some previously unknown, higher-dimensional cases. All this is based on joint work in progress together with Anna Doležalová, Ilmari Kangasniemi and Jani Onninen.