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An application of the degree theory for PDE

Consider set of smooth maps from torus into itself. Consider a subset form by maps with nonnegative Jacobian, i.e., the maps such that the Jacobian at every point is nonnegative. Clearly that this is a closed subset in the C^1 topology. Despite the fact that C^0 topology has fewer closed sets, we have a

Theorem. *The described subset is also closed in the C^0 topology.*

Assuming no initial knowledge about the degree theory we will prove this theorem by the degree techniques.

This theorem is crucial to obtain certain lower bounds for solutions of the multi-dimensional Burgers system and some (weaker) lower bounds for the solutions of the Navier-Stokes system.