Ulrich Koschorke

Nielsen coincidence theory in arbitrary dimensions and Hopf invariants.

Abstract. In classical fixed point and coincidence theory the notion of Nielsen numbers has proved to be extremely fruitful. We extend it to pairs (f_1, f_2) of maps between manifolds of arbitrary dimensions. This leads to estimates of the minimum numbers $MCC(f_1, f_2)$ (and $MC(f_1, f_2)$, resp.) of pathcomponents (and of points, resp.) in the coincidence sets of those pairs of maps which are homotopic to (f_1, f_2). Furthermore, we deduce finiteness conditions for $MC(f_1, f_2)$. As an application we compute both minimum numbers explicitly in various concrete geometric sample situations.

The Nielsen decomposition of a coincidence set is induced by the decomposition of a certain path space $E(f_1, f_2)$ into pathcomponents. Its higher dimensional topology captures further crucial geometric coincidence data. In the setting of homotopy groups the resulting invariants are closely related to certain Hopf-Ganea homomorphisms which turn out to be finiteness obstructions for MC.