The Complement Theorem in n-Shape Theory for Compact Pairs

Yūji Akaike and Katsuro Sakai, Tsukuba, Japan

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Abstract: Let μ^{n+1} be the $(n+1)$-dimensional universal Menger compactum and μ_0^{n+1} a Z-set in μ^{n+1} which is homeomorphic ($\approx$) to μ^{n+1}. In this paper, we generalize Chigogidze's Complement Theorem to compact pairs as follows: for any two Z-pairs (X, X_0) and (Y, Y_0) in (μ^{n+1}, μ_0^{n+1}), $n-\mathrm{Sh}(X, X_0) = n-\mathrm{Sh}(Y, Y_0)$ if and only if $(\mu^{n+1} \setminus X, \mu_0^{n+1} \setminus X_0) \approx (\mu^{n+1} \setminus Y, \mu_0^{n+1} \setminus Y_0)$. To prove this, we generalize two theorems on μ^{n+1}-manifolds (the Z-set approximation theorem and the Z-set unknotting theorem) to μ^{n+1}-manifold pairs.