

1123-03-52

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Computability-theoretic methods in descriptive set theory.

Two given spaces are n -th level Borel isomorphic if there exists a bijection between these spaces which preserves the Borel hierarchy above Σ_{n+1}^0 . The finite level Borel isomorphism problem asks whether any uncountable Polish space is n -th level Borel isomorphic either to the real line or to the Hilbert cube for some integer n . Jayne's theorem (the Baire class version of the Gel'fand-Kolmogorov theorem) connects this problem with the ring-theoretic (and linear-isometric) classification of Banach algebras of finite class Baire functions on compacta (endowed with the supremum norm and the pointwise ring operation). We solve the finite level Borel isomorphism problem by using notions from computability theory such as degree spectra, Scott ideals (ω -models of weak König's lemma), the Shore-Slaman join theorem for the continuous degrees, etc. We also mention the relationship between our solution to the finite level Borel isomorphism problem and Pol's solution to Alexandrov's old problem in infinite dimensional topology. (Received August 11, 2016)