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Choice principles in elementary topology and analysis

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Abstract: Many fundamental mathematical results fail in ZF, i.e., in Zermelo-Fraenkel set theory without the Axiom of Choice. This article surveys results — old and new — that specify how much “choice” is needed precisely to validate each of certain basic analytical and topological results.

Keywords: Axiom of (Countable) Choice, Boolean Prime Ideal Theorem, Theorems of Ascoli, Baire, Čech-Stone and Tychonoff, compact, Lindelöf and orderable spaces

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