Publ. Mat. **68** (2024), 407–429
DOI: 10.5565/PUBLMAT6822403

SUMMABILITY AND DUALITY

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Abstract: We formalize the observation that the same summability methods converge in a Banach space X and its dual X^*. At the same time we determine conditions under which these methods converge in weak and weak* topologies on X and X^* respectively. We also derive a general limitation theorem, which yields a necessary condition for the convergence of a summability method in X. These results are then illustrated by applications to a wide variety of function spaces, including spaces of continuous functions, Lebesgue spaces, the disk algebra, Hardy and Bergman spaces, the BMOA space, the Bloch space, and de Branges–Rovnyak spaces. Our approach shows that all these applications flow from just two abstract theorems.

2020 Mathematics Subject Classification: Primary: 46A35; Secondary: 30H10, 30H20, 30H45.

Key words: summability, limitation theorem, Cesàro mean, Banach space, dual space.