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Characteristic factors and joint ergodicity for commuting transformations and polynomial iterates

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In this talk I will review the notion of joint ergodicity in the context of multiple ergodic averages. Essentially, this property says that a multiple average converges to the "correct"limit, namely a product of integrals. This property was discovered by Furstenberg for linear iterates in weakly mixing systems and extended for polynomials (also in weakly mixing systems) by Bergelson. When considering several commuting transformations results are more scarce, mainly because there is no a well understood notion of ''characteristic factor". By exploiting a recent work by Tao and Ziegler, I will present some developments on the understanding of characteristic factors for multiple averages for commuting transformations, and show some applications of this to the joint ergodicity property in the context of several commuting transformations. This is joint work with Andreas Koutsogiannis and Wenbo Sun.

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