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FINITELY ADDITIVE MEASURES IN THE ERGODIC THEORY OF MARKOV CHAINS. I

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We develop a new approach to the study of general Markov chains (MC), i.e. homogeneous Markov processes with discrete time on an arbitrary phase space. We extend the Markov operator from the traditional space of countably additive measures to the space of finitely additive measures. Given an arbitrary phase space, we construct its "gamma-compactification" to which we extend each Markov chain. We establish an isomorphism between the finitely additive Markov chains on the given space and the Feller chains on its "gamma-compactification." The study is carried out in the framework of the functional operator approach.

Key words and phrases: finitely additive measure, countably additive measure, Markov chain, Markov operators, arbitrary phase space, compactification of an arbitrary phase space, extension of a Markov chain to the compactification.

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