## PROBA 2020 : Mastery Material.

## **Birkhoff's Ergodic Theorem**

• Learn Birkhoff's Ergodic theorem (Setup + Statement + Proof)

• Examples of Applications

• Understand relation of Ergodic Theorem and SLLN. How Ergodic theorem can be applied to prove SLLN.

• Understand Examples of Applications.

Product probability spaces, shift operator, coordinate projections as shifts of one of the projections, simple i.i.d variables, more complicated r.v. which are in  $L_1$  to which application of probability methods would be complicated because they are not mutually independent.

## **Possible Bibliography**

Achim Klenke Probability Theory Ch.20 Ergodic Theory, pp 431-

Rick Durrett Probability: Theory and Examples

https://services.math.duke.edu/~rtd/PTE/PTE4\_1.pdf Chapter 7: Ergodic Theorems, pp 279-

A.V. Skorokhod Basic Principles and Applications of Probability Theory Section 5.2 Ergodic Theorems pp 124-

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