MARKOV KERNELS V1: PROBABILITY

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1. For all $x \in \mathbb{X}, \quad A \mapsto K(x, A) \in \mathscr{P}(\mathbb{X}),$

- A Markov kernel $K : \mathbb{X} \times \mathscr{F} \to [0,1]$ is a function such that

2. For all $A \in \mathscr{F}$, $\quad x \mapsto K(x, A)$ is $\mathscr{F}$-measurable

- In general we will denote $K(x, \mathrm{d}x')$ as the measure may not have a density over $\mathrm{d}x'$

- We will abuse notation and use $K(x, x')$ it interchangeably

- E.g. when $\mathbb{X} = \{x_1, \ldots, x_n\}$ is discrete:
  - We can represent K the a $n \times n$-dimensional square matrix with entries $K(x_i, x_j)$
  - Satisfies $K(x, x') \geq 0$ the rows sum to 1

$$\sum_{x'} K(x, x') = 1$$

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MARKOV KERNELS V2: ALGORITHMS