Hidden Markov Models & Conditional Random Fields

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History

- Developed by Markov in 1906
- Markov was a disciple of Chebyshev along with Lyapunov
- Introduced for no practical reason, except maybe to spite Nekrasov due to the dispute over the Weak Law of Large Numbers
- Within 1 year it was being used to clear up issues in thermodynamics

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Markov Models

- Process with the Markov property: $P(s_{t+1}|s_t, ..., s_0) = P(s_{t+1}|s_t)$
- Process with discrete time

Two processes

- $\begin{bmatrix} p_{00} & p_{01} \\ p_{10} & p_{11} \end{bmatrix}$
- $\sum_j p_{ij} = 1$
- $\begin{bmatrix} p_{00} & p_{01} \\ p_{10} & p_{11} \end{bmatrix} \begin{bmatrix} \pi_0(t) \\ \pi_1(t) \end{bmatrix} = \begin{bmatrix} \pi_0(t+1) \\ \pi_1(t+1) \end{bmatrix}$

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