ST227 Table

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Symbol	Name	Description
S	State Space	Possible values taken by the Markov chain
P	Transition matrix	A matrix containing the probabilities of going between state spaces, rows being "old" and columns being "new" spaces, all 1-step
P_{ij}	Transition probability	A probability of Markov Chain going from state i to state j in 1-step
P_{ij}^n	Transition probability	A probability of Markov Chain going from state i to state j in n-steps
λ	Initial distribution	A vector containing distribution of the first state of the chain
λ_i	Initial probability of state i	A probability of state i being the first state of the Markov's chain, i'th entry of λ
d_i	State Period	Greatest Common divisor of all loops leading from state i to i
H_j	State first hitting time	Number of steps until state j is hit. Is 0 if the start point is state j
H_A	Set first hitting time	Number of steps until set A is hit. Is 0 if the start point is a state in set A
h_{ij}	State hitting probability	Probability of reaching state j from state i.
h_{iA}	Set hitting probability	Probability of entering a set A from state i.
η_{ij}	State expected hitting time	Expected number of steps until state j is reached from state i
η_{iA}	Set expected hitting time	Expected number of steps until set A is reached from state i
T_i	First Return time	Number of steps until state i loops on itself
f_i	Return probability	probability of chain returning back to state i from i, basically h_{ii}
m_i	Expected return time	Expected number of steps until state i loops on itself, basically η_{ii}
V_j	Number of visits	Number of visits to state j
V_A	Number of visits	Number of visits to set of states A
$\mathcal{T}$	Set of Transient States	Subset of S, containing all transient states
μ	Invariant Measure	A vector of positive entries, describing the measure, or "weight" of each state at every step of the chain. Has a property of $\mu = \mu P^n$
π	Invariant Distribution	A special case of invariant measure, distribution describing the distribution of the chain at every step of the chain, has a property of $\pi = \pi P^n$ and $\sum_{i \in S} \pi_i = 1$. Not every chain has π.
γ_i^k	Expected number of visits	Expected number of visits to state i before chain returns to state k
Π	Long Term Transition Matrix	$\Pi = \lim_{n \to \infty} P^n$, with all rows equal to π. Describes the behaviour of the chain after arbitrarily many steps. Not applicable to every Markov Chain