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The limiting stationary distribution

- Complete the following sentence: If all the elements in the transition matrix of a Markov chain are positive all the states in the chain are ...”
- Explain the meaning of the terms eigenvalue and eigenvector and write an equation involving a square matrix, one of its eigenvectors and one of its eigenvalues.
- How is the inverse of a matrix defined? Can a non-square matrix have an inverse?
- Explain what we mean when we state that a matrix is diagonalisable? Can non-square matrices be diagonalized?



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- Explain how you would go about calculating the fourth power of a diagonal matrix?
- The Perron-Frobenius theorem tells us that square matrices with all positive real elements always have a unique largest eigenvalue, λ_1 . What does this tell us about the following limit $\lim_{n \rightarrow \infty} \left(\frac{\lambda_2}{\lambda_1} \right)^n$ if λ_2 is the second largest eigenvalue?
- Consider a 2×2 diagonal matrix, \mathbf{A} , that has $A(1,1) = \lambda$ and calculate the following product of three matrices \mathbf{VAB} . Use v_{11} , v_{12} , v_{21} and v_{22} for the elements of \mathbf{V} and similar names for the elements of \mathbf{B} . What do you notice about the rows of the final product matrix. Explain the significance of this result in the context of Markov chains.