Module-02, Basic Mathematics and Statistics

Mathematics (Linear Algebra)

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3-Months Course
at
Karakaroum international Univrsity

December 26, 2023

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Matrix Decomposition

Definition

Matrix decomposition are a set of methods that we use to describe matrices using more interpretable matrices and give us insight to the matrices' properties.

Determinant

Earlier, we got a quick glimpse of the determinant of a square to determine is invertible? or not.

- The determinant is a very important concept in linear algebra and is used frequently in the solving of systems of linear equations.
- The determinant only exists when we have square matrices.
- Notationally, the determinant is usually written as either $det(A)$ or $|A|$
- Let's take a 2x2 matrix, and from the earlier definition, we know that the matrix applied to its inverse produces the identity matrix.
- It works no differently than when we multiply a with $\frac{1}{a}$ (only true when $a \neq 0$), which produces 1, except with matrices. Therefore, $AA^{-1} = I$.

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How to calculated Inverse

Let's go ahead and find the inverse of our matrix, as follows:

- let a Matrix

Eigenvalues and eigenvectors

- Let's imagine an arbitrary real n×n matrix, A. It is very possible that when we apply this matrix to some vector, they are scaled by a constant value. If this is the case, we say that the nonzero dimensional vector is an eigenvector of A, and it corresponds to an eigenvalue λ. We write this as follows:
- We can rewrite in the form $AX = \lambda X$ is $(A - \lambda I)x = 0$. And since this is equal to zero, this means it is a non convertible matrix, and therefore its determinant too must be equal to zero.

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Singular value decomposition

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Great Job
Thank you