

Matriks invers Moore-Penrose dan aplikasinya pada matriks laplacian = Moore-Penrose inverse on matrices and its application on laplacian matrices

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Abstrak

Invers Moore-Penrose merupakan perumuman invers pada matriks bujur sangkar. Setiap matriks dengan entri bilangan kompleks memiliki invers Moore-Penrose dan invers Moore-Penrose dari suatu matriks adalah tunggal. Ketunggalan invers Moore-Penrose dapat digunakan sebagai pengganti invers pada matriks persegi maupun persegi panjang. Dalam skripsi ini, dibahas konstruksi invers Moore-Penrose melalui A^{-1} , $(A^2)^{-1}$, $(A^2A)^{-1}$, $(A^2A^2)^{-1}$, $(A^2A^3)^{-1}$, dan $(A^2A^4)^{-1}$. Kemudian, dibahas pula konstruksi invers Moore-Penrose dari matriks Laplacian dan beberapa sifat invers Moore-Penrose dari matriks Laplacian. Pada Teorema 4.4, invers Moore-Penrose dari matriks Laplacian memenuhi persamaan $LL^\dagger = L^\dagger L = I + J$, dengan J merupakan matriks berukuran $n \times n$ yang setiap entrinya bernilai satu. Sehingga, invers Moore-Penrose dari matriks Laplacian dapat digunakan sebagai pengganti invers matriks Laplacian.

Moore-Penrose inverse is a generalized inverse from square matrices. Every matrix with complex entries has a unique Moore-Penrose inverse. Uniqueness of Moore-Penrose inverse can be used as a substitute inverse on square or rectangular matrices. In this skripsi, the construction of Moore-Penrose inverse is explain through A^{-1} , $(A^2)^{-1}$, $(A^2A)^{-1}$, $(A^2A^2)^{-1}$, $(A^2A^3)^{-1}$, and $(A^2A^4)^{-1}$. Moreover, the construction of Moore-Penrose inverse for Laplacian matrices, as well as some properties of the inverse, is also discussed. In Theorem 4.4, Moore-Penrose inverse satisfy the equation $LL^\dagger = L^\dagger L = I + J$, where J is an $n \times n$ matrix with all entries are one. Moore-Penrose inverse is a generalized inverse from square matrices. Every matrix with complex entries has a unique Moore-Penrose inverse. Uniqueness of Moore-Penrose inverse can be used as a substitute inverse on square or rectangular matrices. In this skripsi, the construction of Moore-Penrose inverse is explain through A^{-1} , $(A^2)^{-1}$, $(A^2A)^{-1}$, $(A^2A^2)^{-1}$, $(A^2A^3)^{-1}$, and $(A^2A^4)^{-1}$. Moreover, the construction of Moore-Penrose inverse for Laplacian matrices, as well as some properties of the inverse, is also discussed. In Theorem 4.4, Moore-Penrose inverse satisfy the equation $LL^\dagger = L^\dagger L = I + J$, where J is an $n \times n$ matrix with all entries are one.