MOORE-PENROSE GENERALIZED INVERSE OF POLYNOMIAL MATRICES OVER $F[x_1,x_2,..,x_n]$, $Z[x_1,x_2,..,x_n]$ and $\mathbb{R}[x_1,x_2,..,x_n]^*$

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ABSTRACT

In this thesis we discuss about necessary and sufficient condition for the existence of Moore-Penrose generalized inverse for polynomial matrices over an integral domain $R=F[x_1,x_2,..,x_n]$ and $Z[x_1,x_2,..,x_n]$. We also discussed about necessary and sufficient condition for the existence of Moore-Penrose generalized inverse for any matrices over $R = \mathbb{R}[x_1,x_2,\ldots,x_n]^*$ the ring of rational functions $a(x_1,x_2,\ldots,x_n)b(x_1,x_2,\ldots,x_n)^{-1}$ with real coeficients and with $b(x_1,x_2,\ldots,x_n) \neq 0$ for all $(x_1,x_2,\ldots,x_n)$ in R^n.

An m x n matrix A over an integral domain $R=F[x_1,x_2,..,x_n]$ has generalized inverses Moore-Penrose if only if there exist orthogonal matrices $P(mxm)$, $Q(nxn)$ and unitair matrix M such that $A = P\begin{bmatrix} M & 0 \\ 0 & 0 \end{bmatrix}Q$.

An m x n matrix A over $R = \mathbb{R}[x_1,x_2,..,x_n]^*$ has generalized inverses Moore-Penrose if only if A can be written as PA_0Q $(A = PA_0Q)$ with P,Q unimodular R-matrices and $A_0 = \begin{bmatrix} I_r & 0 \\ 0 & 0 \end{bmatrix}$, rank A = r constant over all $(x_1,x_2,\ldots,x_n)$ in R^n.

Key words : Integral domain, Moore-Penrose generalized inverse, polynomial matrices.

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