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On constrained generalized inverses of matrices and their properties

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Abstract A matrix G is called a generalized inverse (g -inverse) of matrix A if $AGA = A$ and is denoted by $G = A^-$. Constrained g -inverses of A are defined through some matrix expressions like $E(AE)^-$, $(FA)^-F$ and $E(FAE)^-F$. In this paper, we derive a variety of properties of these constrained g -inverses by making use of the matrix rank method. As applications, we give some results on g -inverses of block matrices, and weighted least-squares estimators for the general linear model.

Keywords Linear matrix expression · Moore–Penrose inverse · Constrained generalized inverses · Matrix equation · Projector · Idempotent matrix · Rank equalities · General linear model · Weighted least-squares estimator