New generalizations of the core and dual core inverses

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Abstract. In order to solve some systems of operator equations, we introduce two new classes of generalized inverses. Since we extend the concepts of the dual core and core inverses, these new inverses are called the *generalized dual core* (or GDC) *inverse* and the *generalized core* (or GC) *inverse*. Several equivalent conditions for an operator to be the GDC and GC inverses are established. Various representations for the GDC inverse, such as the canonical form and the most general form, are developed. We consider the relations between the GDC inverse and known generalized inverses. The GDC relation is defined and characterized in terms of the GDC inverse. Applying the GDC and GC inverses, we solve some systems of linear equations.

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