Classical left regular left quotient ring of a ring and its semisimplicity criteria

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Abstract

Let R be a ring, $\mathcal{C}_R$ and ${}'\mathcal{C}_R$ be the set of regular and left regular elements of R ($\mathcal{C}_R \subseteq {}'\mathcal{C}_R$). Goldie's Theorem is a semisimplicity criterion for the classical left quotient ring $Q_{l,cl}(R) := \mathcal{C}_R^{-1} R$. Semisimplicity criteria are given for the classical left regular left quotient ring ${}'Q_{l,cl}(R) := {}'\mathcal{C}_R^{-1} R$. As a corollary, two new semisimplicity criteria for $Q_{l,cl}(R)$ are obtained (in the spirit of Goldie).