

Year: 2011	Vol.: 78	Fasc.: 2
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Title: Two generalisations of the symmetric inverse semigroups

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We study two generalisations of the full inverse symmetric semigroup $\mathcal{I}_X$ and its dual semigroup $\mathcal{I}_X^*$ – inverse semigroups $\mathcal{PI}_X^*$ and $\overline{\mathcal{PI}_X^*}$. Both of them have the same carrier and contain $\mathcal{I}_X$. Binary operations on $\mathcal{PI}_X^*$ and $\overline{\mathcal{PI}_X^*}$ are reminiscent of the multiplication in $\mathcal{I}_X$. We use a convenient geometric way to realise elements from these two semigroups. This enables us to study efficiently their inner properties and to compare them with the corresponding properties of $\mathcal{I}_X$ and $\mathcal{I}_X^*$.

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