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 $\mathcal{I}_X^\dagger$—inverse semigroups $\mathcal{P}\mathcal{I}_X^\dagger$ and $\overline{\mathcal{P}\mathcal{I}}_X$. Both of them have the same carrier and contain $\mathcal{I}_X$. Binary operations on $\mathcal{P}\mathcal{I}_X^\dagger$ and $\overline{\mathcal{P}\mathcal{I}}_X$ 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 $\mathcal{I}_X^\dagger$.

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