Title:	Split metacyclic actions on surfaces
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Abstract:	Let Mod(Sg) be the mapping class group of the closed orientable surface Sg of genus g ≥ 2. In this paper, we derive necessary and sufficient conditions under which two torsion elements in Mod(Sg) will have conjugates that generate a non-abelian finite split metacyclic subgroup of Mod(Sg). As applications of the main result, we give a complete characterization of the finite dihedral and the generalized quaternionic subgroups of Mod(Sg) up to a certain equivalence that we will call weak conjugacy. Furthermore, we show that any finite-order mapping class whose corresponding orbifold is a sphere has a conjugate that lifts under certain finite-sheeted regular cyclic covers of Sg. Moreover, for g ≥ 5, we show the existence of an infinite dihedral subgroup of Mod(Sg) that is generated by an involution and a root of a bounding pair map of degree 3. Finally, we provide a complete classification of the weak conjugacy classes of the non-abelian finite split metacyclic subgroups of Mod(S3) and Mod(S5). We also describe nontrivial geometric realizations of some of these actions.
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