Coinvariant Algebras of Finite Subgroups of $\text{SL}(3, \mathbb{C})$

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Abstract. For most of the finite subgroups of $\text{SL}(3, \mathbb{C})$ we give explicit formulae for the Molien series of the coinvariant algebras, generalizing McKay’s formulae [McKay99] for subgroups of $\text{SU}(2)$. We also study the $G$-orbit Hilbert scheme $\text{Hilb}^G(\mathbb{C}^3)$ for any finite subgroup $G$ of $\text{SO}(3)$, which is known to be a minimal (crepant) resolution of the orbit space $\mathbb{C}^3/G$. In this case the fiber over the origin of the Hilbert-Chow morphism from $\text{Hilb}^G(\mathbb{C}^3)$ to $\mathbb{C}^3/G$ consists of finitely many smooth rational curves, whose planar dual graph is identified with a certain subgraph of the representation graph of $G$. This is an $\text{SO}(3)$ version of the McKay correspondence in the $\text{SU}(2)$ case.