The Borel fixed point method for the determination of singularities of the invariant Hilbert scheme

Let $G$ be a reductive algebraic group over an algebraically closed field $k$ acting on an affine scheme $W$. Then we can construct the so-called invariant Hilbert scheme $\mathcal{H}$ which parametrizes the $G$-invariant closed subschemes $Z$ of $W$ in such a way that the coordinate ring $k[Z]$ of $Z$ can be written as the direct sum of simple $G$-modules. We will take a look at how the invariant Hilbert scheme is constructed and at how to search for its singularities with the Borel fixed point method.