Low degree equations for the Hilbert Schemes

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What are the equations for the Hilbert schemes in their natural embeddings? Different set of (high degree) equations have been found. Among them, the determinantal equations by Tony Iarrobino and Steve Kleiman.

In this talk, a new construction of the Hilbert scheme will be given, from which we derive a set of equations of degree one and two.

Our construction extends the description by Nakajima of $\operatorname{Hilb}^p(\mathbb{A}^2)$ to the projective case and a non constant polynomial. The Hilbert scheme is described as a quotient of a scheme of quiver representations.

The equations are reminiscent of the Plücker relations for Grassmannians: they are explicit and built formally with permutations on indexes on the Plücker coordinates.