Symbolic Invariant Calculus

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The theory of equivariant moving frames is a modern reformulation of Cartan's method of moving frames with the distinctive advantage that many computations can be performed symbolically, without requiring coordinate expressions for the invariants or the moving frame. This is possible thanks to the recurrence formulas, which encapsulate the extend by which the invariantization process that emerges from the construction of a moving frame does not commute with differentiation in differential geometry or shift maps in the discrete setting. The symbolic invariant calculus that emerged from these recurrence relations has led to a wide range of new results in geometry, the study of geometric invariant curve flows, the calculus of variations, the integration of differential equations, and much more.

In the first half of my presentation I will introduce the method of equivariant moving frames and the important recurrence formulas. In the second half of the talk I will survey recent applications of the resulting symbolic invariant calculus.