Evaluation techniques and symmetric polynomials

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Abstract

Standard algorithms for dealing with symmetric polynomials are presented using rewriting techniques. This is for instance the case of the "fundamental theorem of symmetric polynomials", which states that any symmetric polynomial is a polynomial in the elementary symmetric ones, and whose proof involves rewriting using a suitable elimination order.

This kind approach usually spoils useful features such as sparseness, so its complexity is hard to control. By contrast, I will show how the straight-line program representation of polynomials yields improved results. My first focus is on polynomial invariants under the symmetric group, but other actions will be discussed as well.