New algorithm for differential elimination based on support bound

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Differential elimination refers to finding consequences of a system of differential equations depending only on a chosen subset of variables. In the context of dynamical modeling, one often starts with a polynomial dynamical system of the form $\mathbf{x}' = \mathbf{g}(\mathbf{x})$ and is interested to obtain the minimal equation satisfied by a single component of $\mathbf{x}$ (for example, x_1). Based on the degrees of the polynomials in $\mathbf{g}$, we give an upper bound on the support of such minimal equation which can be further used, for example, for computing this equations using an ansatz. We show that our bound is sharp in "more than half the cases"