

1116-03-67

James Freitag* (freitagj@gmail.com), UCLA Mathematics Department, Box 951555, Los Angeles, CA 90095-1555. *Differential algebra and special points conjectures.*

Special points conjectures are a general class of problems in arithmetic geometry. One is given a set of special points, \mathcal{S} , usually with some arithmetic significance, inside of some variety V . The general problem is to understand how this set \mathcal{S} intersects subvarieties of V . For instance, in which subvarieties $W \subset V$ is the set \mathcal{S} dense? Examples of conjectures (and theorems) which fit this template are the Manin-Mumford conjecture, the André-Oort conjecture, the Pila-Wilkie theorem.

We will describe a special points conjecture in which \mathcal{S} consists of an isogeny class of a product of elliptic curves. Though far from being definable sets in any tame structure, isogeny classes satisfy a differential equation which is closely related to the j -function. Analyzing the properties this differential equation allows us to prove results regarding the intersections of \mathcal{S} with varieties. Model theory can be used to make these results effective. The structure of the differential equation satisfied by the j -function also allows us to answer a question of Hrushovski about strongly minimal sets in differentially closed fields. We will also explain some extensions of these ideas to other automorphic functions. (Received September 10, 2015)