Constructing Level Algebras from Points

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In a recent monograph with A.V. Geramita, T. Harima and Y. Shin, we began a careful analysis of the possible Hilbert functions of level Artinian algebras. These can be defined in many equivalent ways, as we will discuss. Most of the monograph deals with the Artinian case. The overriding problem is to determine what Hilbert functions occur among level algebras. However, we also study some problems that arise connecting sets of points and level algebras. For example,

1. What numerical functions arise as the Hilbert function of a reduced set of points whose Artinian reduction is level (which we call a level set of points)?

2. How do you find level sets of points?

3. What methods are there for constructing level Artinian algebras from reduced (not necessarily level) sets of points?

4. What properties do the algebras have that are produced in these ways?

5. How do the geometric properties of the points and the algebraic properties of the level algebras interact?

This talk will focus on this geometric side of the work.