Preprojective algebras and Lie theory

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Many interesting and motivating examples of cluster algebras appear in Lie theory as coordinate rings of classical varieties attached to Lie groups and Kac-Moody groups (e.g. Grassmannians, flag varieties, double Bruhat cells, etc.). Some of these examples can be understood by relating them to certain categories of modules over a preprojective algebra. In these lectures, we will explain this mechanism of "additive categorification" and illustrate it with a few concrete examples.