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Apoorva Khare* (khare@stanford.edu). *Matched pairs of monoids, Hopf algebras, and the BGG Category \mathcal{O} .*

The Bernstein-Gelfand-Gelfand Category \mathcal{O} is a fundamental construction in the study of representations of algebras with triangular decomposition. We introduce an axiomatic construction of such algebras, where the “Cartan subalgebra” is a commutative (topological) Hopf algebra. Our framework encompasses symmetrizable Kac-Moody Lie algebras and their quantum groups, the Virasoro Lie algebra and its extensions, a large class of generalized Weyl algebras, and continuous and infinitesimal Hecke algebras, among others.

We term such algebras Regular Triangular Algebras (RTAs); each RTA comes equipped with a matched pair of monoids, consisting of the “positive” and “negative” cones of roots. We characterize the monoid pairs that can arise out of an RTA under reasonably weak assumptions. This enables the first construction of an algebra with a triangular decomposition, which possesses a *non-abelian* root lattice. (Received July 28, 2015)