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**Milen T. Yakimov** (yakimov@math.lsu.edu). *Methods for constructing matrix-valued bispectral operators.*

In 1996 Bakalov, Horozov, and Yakimov presented a general framework for constructing solutions to the scalar-valued bispectral problem. We find noncommutative analogs of these results for matrix-valued bispectral functions. We explicitly construct large families of solutions based on rational Darboux transformations of generalized Bessel and Airy solutions, which include as special cases many previously known results. (Received September 22, 2010)