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A new perspective on the q -Onsager algebra and its presentations

When working with association schemes and distance-regular graphs, there arises an associated matrix algebra called the Bose-Mesner Algebra. The generators for this algebra satisfy a pair of tridiagonal commutator relations, and an affine transformation of these relations gives the q -Onsager algebra.

The q -Onsager algebra (O_q) contains several sets of recursively defined elements. Although O_q has only two generators, explicit polynomial forms for these elements are not yet known. Here we give an algebra called the quantum torus (T_q) and show that the images of many of these elements under a homomorphism to T_q have pleasing closed forms; this may allow for some mysteries about O_q to be solved.