1093-17-324   **James Lepowsky*** (`lepowsky@math.rutgers.edu`). *The vertex-algebraic structure of principal subspaces as categorification.*

The classical Rogers-Ramanujan recursion (q-difference equation) relates the two Rogers-Ramanujan identities, and its solution gives the difference-two condition for partitions. In past work with S. Capparelli and A. Milas we in a certain sense "categorified" this recursion, and generalizations, by using intertwining operators in vertex operator algebra theory to construct exact sequences among the principal subspaces of standard $\widehat{sl(2)}$-modules. The exactness of the sequences lifts the recursions to a categorical setting revealing new vertex-algebraic structure, and the solution of the recursions now gives the graded dimensions ("characters") of the principal subspaces. In an ongoing program with C. Calinescu and Milas, we have sharpened those results and extended the new methods to further families of algebras and modules. We have been generalizing our methods to the subtler setting of twisted modules for vertex operator algebras. Recently, Calinescu, Milas and I have, in a "test case" of the new viewpoint, "categorified" (in the same sense) a classical recursion by constructing an exact sequence involving a twisted principal subspace, yielding its graded dimension as a consequence. (Received August 19, 2013)