

LIENEAR ALGEBRA APPLICATIONS

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We establish a q -analogue of the classical decomposition of $\bigwedge^k(W^+ \oplus W^-)$. As applications we prove a nontrivial relation in a diagrammatic category Web^B , a multiplicity free decomposition of an anti-spherical Hecke module, and a multiplicity free decomposition of quantum exterior powers into irreducible modules over the type AIII (without black nodes) quantum symmetric pair subalgebra U'_q . Furthermore, we realise the category of fundamental representations of U'_q as an explicit quotient of Web^B . In the case the underlying Dynkin type is A_{2r+1} , we define Verma modules via a triangular decomposition of U'_q and prove that finite dimensional simple U'_q -modules are classified by our Verma modules. Finally, we explicitly determine the highest weight vectors and their weights inside quantum exterior powers, thereby determining the isomorphism classes of their irreducible summands.