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# Calculation of BRS Cohomology with Spectral Sequences

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**Abstract.** A method for finding the general form of the BRS cohomology space $H$ for the various gauge and supersymmetry theories is presented. The method is adapted for use in the space of integrated local polynomials of the gauge fields and ghosts with arbitrary numbers of fields and dervivatives. The technique uses the Hodge decomposition in a Fock space with a Euclidean inner product, and combines this with spectral sequences to generate simple and soluble equations whose solutions span a simple space $E_\infty$ isomorphic to the complicated space $H$. The technique is illustrated for pedagogic purposes by the detailed calculation of the ghost charge zero and one sectors of $H$ for Yang-Mills theory with gauge group $SO(32)$ in ten dimensions. The method is appropriate for supersymmetric theories, gravity, supergravity and superstrings where higher order terms with many derivatives occur naturally in the effective action.

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