THE CONFORMAL KILLING EQUATION ON FORMS - PROLONGATIONS AND APPLICATIONS

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We construct a conformally invariant vector bundle connection such that its equation of parallel transport is a first order system that gives a prolongation of the conformal Killing equation on differential forms. Parallel sections of this connection are related bijectively to solutions of the conformal Killing equation. We construct other conformally invariant connections, also giving prolongations of the conformal Killing equation, that bijectively relate solutions of the conformal Killing equation on k-forms to a twisting of the conformal Killing equation on $(k-\ell)$-forms for various integers ℓ. These tools are used to develop a helicity raising and lowering construction in the general setting and on conformally Einstein manifolds. (Joint work with A. Rod Gover.)