Combinatorial differential geometry: reduction theorems revisited

We apply the graph complex approach of arXiv:math/0612183 to natural differential operators acting on vector fields and a linear symmetric connection. We characterize all possible systems of generators for such vector-field valued operators including the classical ones given by normal tensors and covariant derivatives (thus reproving classical results by Schouten, Thomas,…). We also describe the size of the space of such operators and prove the existence of an ‚ideal' basis consisting of operators with given leading terms which satisfy the (generalized) Bianchi-Ricci identities without the correction terms. The talk will be based on a joint paper arXiv:0809.1158 with J. Janyska.

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