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Green's conjecture for curves on K3 surfaces

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This is a joint work with G. Farkas. The syzygy theory is concerned with the qualitative study of the homogeneous equations of projective varieties. From syzygies one can recover many basic invariants of the embedding such as the Hilbert function. Currently, the efforts of the experts are oriented towards understanding the relations between syzygies and geometric invariants, especially in the curve case. The final goal is to build powerful tools for studying the geometry of various moduli spaces. At the heart of the theory lies a conjecture made by Green in the 1980's, a deceptively simple statement predicting that the Clifford index can be read off syzygies of canonical embeddings. Building on previous foundational works of Claire Voisin and using Brill-Noether theory we find a complete solution of Green's conjecture for curves on K3 surfaces.
