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Two-loop unitarity and dual conformal symmetry

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We show that the power of generalized unitarity cuts extends beyond the construction of integrands. Both integration-by-parts identities and differential equations can be derived on unitarity cuts, using tangent vectors of unitarity cut surfaces. We present applications, from the extraction of symbol alphabets for nonplanar two-loop five-point integrals to the evaluation of UV divergences in 5-loop supergravity. A surprising connection with dual conformal symmetry is presented, which offers an analytic alternative to computational algebraic geometry, and also shines light on the generalization of dual conformal symmetry to nonplanar integrals.

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