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Cocycles for GL_n and graph complexes from differential forms

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We study invariant differential forms on the space of positive definite matrices. Integration of these forms gives rise to functionals that satisfy relations due to Stokes'theorem. In certain degrees, these relations allow us to interpret the integrals as cocycles for the general linear group or graph complexes. This construction explains many new cohomology classes. Perhaps surprisingly, for even n, the same differential form behaves very differently in the two contexts—so much so that the cohomology classes we construct for the odd graph complex are not pullbacks from our classes for GL_{2n}.

This is joint work (arXiv:2406.12734) with Francis Brown and Simone Hu.

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