An Exterior Algebra Valued Tutte Function on Linear Matroids or their Pairs

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Summary

1. Usual parametrized Tutte functions F are valued in comm. rings.
2. Matrix Tree Theorem: The tree enumerator Tutte function is a determinant.
3. Our generalization of the represented matroid basis enumerating determinant is a restricted Tutte function valued in exterior algebras (ie., anti-symmetric tensor spaces.)
4. Restricted (against set P) aka set P pointed, P-"ported" F

$$F(M,P) = r_e F(M \setminus e) + g_e F(M/e)$$

only when non-loop non-coloop $e \notin P$.

5. P will play the role of graph vertices.
6. $$F \to$$

Summary

Main idea: use colored directed graphs to encode certain representations V of the quantum group $U_q(\mathfrak{g})$ as $q \to 0$ ($\mathfrak{g}$ complex semisimple or affine Lie algebra).

after vspae

History

Kirchhoff's "Matrix Tree Theorem": The solution to the linear resistive electrical network (Kirchhoff's and Ohm's laws) problem is comprised of ratios of certain tree or forest enumerators. Maxwell expressed those problems with matrices. EEs call Kirchhoff's result "Maxwell's rule."