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**Frank Sottile\*** ([sottile@math.tamu.edu](mailto:sottile@math.tamu.edu)), Department of Mathematics, Mail Stop 3368, Texas A&M University, College Station, TX 77843. *Simple counting of integer points via irrationality.*

In 1988 Brion gave a formula for the integer points in a rational polytope in  $\mathbb{R}^d$  in terms of certain rational generating functions associated to its vertices. His proof used the equivariant  $K$ -theory of singular toric varieties, and his formula led to Barvinok's polynomial-time algorithm for the integer points in a polytope.

I will present a proof of Brion's Theorem based on simple counting, using the technique of irrational decompositions. This is joint work with Beck and Haase. I will also describe how Koeppel uses irrational decompositions to dramatically improve the performance of Barvinok's algorithm. (Received September 07, 2006)