1070-05-28 **Glenn D. Appleby*** (`gappleby@scu.edu`) and **Tamsen Whitehead**. *Products of Littlewood-Richardson Fillings and Flows on Honeycombs.*

The Littlewood-Richardson (or "LR") coefficient $c_{\mu\nu}^{\lambda}$ for partitions μ, ν and λ counts "fillings" $\{k_{ij}\}$ of the skew shape λ/μ with content ν. King, Tollu and Toumazet found conditions under which LR coefficients factor as a product of coefficients of sub-partitions. Here we present a *product* on LR fillings themselves which recovers the factorizations of King, et al, but is defined more generally for arbitrary fillings. Given two LR fillings $\{k_{ij}\}$ of shape λ/μ of content ν and $\{k'_{ij}\}$ of shape λ'/μ' of content ν', our algorithm produces a third filling of shape λ''/μ'' of content ν'', where, μ'' is obtained by from the parts of μ and μ', etc. We show that this product on LR fillings is the "right" one by proving it recovers the filling obtained by the *overlay* operation of two honeycombs (combinatorial invariants equivalent to LR fillings and of recent interest in representation theory). To do this, we develop a novel *flow* on a honeycomb, and show how our combinatorial algorithm mirrors rectifying flows on the overlay of two honeycombs. Questions on the factored structure of fillings will also be discussed. (Received December 15, 2010)