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The content series, Jucys-Murphy elements and branched covers

We consider the content series, a symmetric function involving a product over the cells in a partition, of an indeterminate indexed by content. We give a new partial differential equation for the content series, expressed in terms of families of operators that we call U and D operators, whose action on a Schur function s_λ can be simply expressed in terms of powers of the contents of the cells in λ. Among our results, we construct the U and D operators explicitly as partial differential operators in the power sums. We also give a combinatorial interpretation for the content series in terms of the Jucys-Murphy elements in the group algebra of the symmetric group. This leads to an interpretation for the content series as a generating series for branched covers of the sphere by a Riemann surface of arbitrary genus g. Applications in genus 0 are given to Hurwitz numbers, monotone Hurwitz numbers, and m-hypermap numbers of Bousquet-Mélou and Schaeffer.