

Asymptotics of Growth in Algebras

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Let λ denote a partition of a natural number n and f^λ the number of standard tableau of shape λ . The value of f^λ is given - for example - by the so called “Hook Formula”. Various natural questions - in Combinatorics, Representation Theory, Polynomial Identity Algebras, and even in Physics - motivate the study of the sums

$$S_k^{(\beta)}(n) = \sum_{\lambda \in \Lambda_k(n)} (f^\lambda)^\beta$$

where $\Lambda_k(n)$ are the partitions with $\leq k$ parts. The asymptotics of $S_k^{(\beta)}(n)$ involves the Selberg integral, and establishes a connection between the combinatorics and “Random matrices”. Related to $S_k^{(\beta)}(n)$ are also the codimension of Polynomial Identity algebras, and we discuss some recent results on their asymptotics.