

1 The $n!$ and the $(n + 1)^{n-1}$ Conjectures/Theorems

This project consists of learning more about the $n!$ and the $(n + 1)^{n-1}$ Theorems, see e.g. [6, Section 3] for a quick overview and [1, 2, 3] and the references therein for original sources and more information, as well as [4, 5] for proofs.

References

- [1] Adriano M. Garsia and Mark Haiman. A graded representation model for Macdonald's polynomials. *Proceedings of the National Academy of Sciences of the United States of America*, 90(8):3607–3610, 1993.
- [2] Adriano M. Garsia and Mark Haiman. Some natural bigraded S_n -Modules. *The Electronic Journal of Combinatorics*, 3(2):R24, January 1996.
- [3] Mark Haiman. Conjectures on the Quotient Ring by Diagonal Invariants. *Journal of Algebraic Combinatorics*, 3(1):17–76, January 1994.
- [4] Mark Haiman. Hilbert schemes, polygraphs and the Macdonald positivity conjecture. *Journal of the American Mathematical Society*, 14(4):941–1006, 2001.
- [5] Mark Haiman. Vanishing theorems and character formulas for the Hilbert scheme of points in the plane. *Inventiones mathematicae*, 149(2):371–407, August 2002.
- [6] Richard P. Stanley. Recent progress in algebraic combinatorics. volume 40, pages 55–68. 2003. *Mathematical challenges of the 21st century* (Los Angeles, CA, 2000).