

# Algebra V: Representations of $S_N$ and $GL(V)$

2h lecture at TU Berlin, WS 2017/18, Prof. P. Bürgisser

## Chap. 1. The irreducible representations of $S_N$

- 1.1 Partitions and diagrams
- 1.2 Permutation modules and their characters
- 1.3 Specht modules
- 1.4 Standard tableaux and a basis of  $\mathcal{S}_\lambda$
- 1.5 Robinson-Schensted-Knuth correspondence

## Chap. 2. The irreducible representations of $GL(V)$

- 2.1 The rational representations of  $GL(V)$
- 2.2 Schur-Weyl modules
- 2.3 Decomposition of the tensor space  $V^{\otimes N}$
- 2.4 A basis for  $\mathcal{W}_\lambda$

## Chap. 3. Characters of $S_N$ and $GL(V)$

- 3.1 Schur functions
- 3.2 Characters of rational  $GL(V)$ -modules
- 3.3 Weyl's character formula
- 3.4 Frobenius' character formula and Murnaghan-Nakayama rule
- 3.5 Symmetric polynomials and Pieri's rule