

## Index of notation

### Chapter 0

$GL_n(K)$	the general linear group of invertible $n \times n$ matrices with entries in the field $K$ , 0.3
$c_{ij}$	coefficient functions on $GL_n(K)$ , 0.3, and elements of the coordinate algebra of quantum $GL_n$ , 0.20
$d$	the determinant function on $GL_n(K)$ , 0.3
$K[GL_n(K)]$	the coordinate algebra of $GL_n(K)$ , 0.3
$\text{cf}(V)$	the coefficient space of a module $V$ , 0.4
$GL_n$	$GL_n(K)$ regarded as a $k$ -group, 0.9
$\text{Comod}(C)$	the category of right $C$ -comodules, for a coalgebra $C$ , 0.9
$\text{comod}(C)$	the category of finite dimensional right $C$ -comodules, for a coalgebra $C$ , 0.9
$\text{Mod}(S)$	the category of left $S$ -modules, for an algebra $S$ , 0.9
$\text{mod}(S)$	the category of finite dimensional left $S$ -modules, for an algebra $S$ , 0.9
$\text{Mod}(G)$	$\text{Comod}(k[G])$ , for a $k$ -group or quantum group $G$ , 0.10, 0.20
$\text{mod}(G)$	$\text{comod}(k[G])$ , for a $k$ -group or quantum group $G$ , 0.10, 0.20
$X(n)$	$\mathbb{Z}^n$ , 0.12
$V^\alpha$	the $\alpha$ weight space of the module $V$ , 0.12
$\mathbb{Z}X(n)$	the integral group ring of $X(n)$ , 0.12
$\text{ch } V$	the character of $V$ , 0.12
$E$	the natural $GL_n$ -module, 0.13
$S^r E$	the $r$ th symmetric power of $E$ , 0.13
$\bigwedge^r E$	the $r$ th exterior power of $E$ , 0.13
$D$	the determinant module, 0.13
$A(n)$	$k[c_{ij} \mid 1 \leq i, j \leq n]$ , 0.13
$A(n, r)$	the degree $r$ component of $A(n)$ , 0.13
$S(n, r)$	the Schur algebra, i.e. the dual algebra of the coalgebra $A(n, r)$ , 0.13
$G(n)$	$GL_n$ , 0.14
$T(n)$	$GL_1^n$ , 0.14
$I(n, r)$	the set of all maps $i : [1, r] \rightarrow [1, n]$ , 0.14
$\text{Sym}(r)$	the symmetric group of degree $r$ , 0.14
$ \alpha $	$\alpha_1 + \alpha_2 + \dots$ (for $\alpha = (\alpha_1, \alpha_2, \dots)$ ), 0.14
$\Lambda(n, r)$	the set of $\alpha \in \mathbb{N}_0^n$ such that $ \alpha  = r$ , 0.14
$\xi_{ij}$	an element of the basis of $S(n, r)$ dual to the monomial

	basis of $A(n, r)$ , 0.14
$\xi_\alpha$	$\xi_{ii}$ , where $i \in I(n, r)$ has content $\alpha$ , 0.14
$\leq$	the natural (dominance) partial order, 0.15
$X^+(n)$	the set of dominant weights, 0.15
$L(\lambda)$	the simple $GL_n$ -module of high weight $\lambda$ , 0.15
$\text{Ind}_H^G$	the induction functor from $H$ -modules to $G$ -modules, 0.16, 0.20
$B(n)$	the (Borel) subgroup of $G(n)$ consisting of lower triangular matrices, 0.16
$k_\lambda$	the 1-dimensional $B(n)$ -module labelled by $\lambda \in X(n)$ , 0.16, and 1-dimensional $B_q(n)$ -module labelled by $\lambda \in X(n)$ , 0.21
$\nabla(\lambda)$	$\text{Ind}_{B(n)}^{G(n)} k_\lambda$ , 0.16
$\bigwedge^\alpha E$	$\bigwedge^{\alpha_1} E \otimes \bigwedge^{\alpha_2} E \otimes \dots$ (for $\alpha = (\alpha_1, \alpha_2, \dots)$ ), 0.16
$\Lambda^+(n, r)$	$\Lambda(n, r) \cap X^+(n)$ , 0.16
$[\nabla(\lambda) : L(\mu)]$	the multiplicity of $L(\mu)$ as a composition factor of $\nabla(\lambda)$ , 0.17
$\Lambda^+(n, r)_{\text{col}}$	set of column regular partitions, 0.18
$\Lambda^+(n, r)_{\text{row}}$	set of row regular partitions, 0.18
$\omega$	$(1, 1, \dots, 1) \in \Lambda(n, r)$ , 0.18
$e$	$\xi_\omega$ , 0.18
$f$	the Schur functor, 0.18 (and 2.1)
$\text{Hec}(r)$	the Hecke algebra of $\text{Sym}(r)$ , 0.19 (and $eS(n, r)e$ in 2.1)
$l(w)$	the length of $w \in \text{Sym}(r)$ , 0.19
$T_w$	basis element of the Hecke algebra, 0.19
$A_q(n)$	a $q$ -deformation of $A(n)$ , 0.20
$A_q(n, r)$	the degree $r$ component of $A_q(n)$ , 0.20
$S_q(n, r)$	the Schur $q$ -algebra, i.e. the dual algebra of the coalgebra $A_q(n, r)$ , 0.20
$d_q$	the quantum determinant, 0.20
$G_q(n)$	the quantum general linear group, 0.20
$B_q(n)$	the (Borel) subgroup of $G_q(n)$ with defining ideal generated by $c_{ij}$ , $i < j$ , 0.21
$\nabla_q(\lambda)$	$\text{Ind}_{B_q(n)}^{G_q(n)} k_\lambda$ , 0.21
$L_q(\lambda)$	the socle of $\nabla_q(\lambda)$ , 0.21

Chapter 1

$\text{cf}(E)$	the coefficient space of a comodule $E$ , 1.1
$E^*, V^*$	dual comodules, 1.1
$\text{ad}(\phi)$	the adjoint of the linear map $\phi$ , 1.1
$[a, b]$	$\{a, a + 1, \dots, b\}$ , 1.2
$\text{Sym}(X)$	the group of permutations of a set $X$ , 1.2

$A(n)$	an $R$ -algebra defined by generators and relations, 1.2
$A(n, r)$	the degree $r$ component of $A(n)$ , 1.2
$M = M(n)$	the quantum general linear monoid, 1.2
$G = G(n)$	the quantum general linear group, 1.2
$E, V$	the natural left and right $M$ -modules, 1.2
$\bigwedge(E), \bigwedge(V)$	the (quantum) exterior algebras over $E$ and $V$ , 1.2
$\bigwedge^r(E), \bigwedge^r(V)$	the $r$ th (quantum) exterior powers of $E$ and $V$ , 1.2
$e_i$	$e_{i_1} \otimes \cdots \otimes e_{i_r} \in E^{\otimes r}$ , for $i = (i_1, \dots, i_r) \in I(n, r)$ , 1.2
$v_i$	$v_{i_1} \otimes \cdots \otimes v_{i_r} \in V^{\otimes r}$ , for $i = (i_1, \dots, i_r) \in I(n, r)$ , 1.2
$\hat{e}_i$	the image of $e_i$ under the natural map $E^{\otimes r} \rightarrow \bigwedge^r E$ , 1.2
$\hat{v}_i$	the image of $v_i$ under the natural map $V^{\otimes r} \rightarrow \bigwedge^r V$ , 1.2
$P(n)$	a certain set of sequences of non-negative integers, 1.2
$(\alpha \beta)$	the concatenation of $\alpha, \beta \in P(n)$ , 1.2
$\bigwedge^{\alpha} E$	$\bigwedge^{\alpha_1} E \otimes \bigwedge^{\alpha_2} E \otimes \cdots$ , for $\alpha = (\alpha_1, \alpha_2, \dots)$ , 1.2
$\bigwedge^{\alpha} V$	$\bigwedge^{\alpha_1} V \otimes \bigwedge^{\alpha_2} V \otimes \cdots$ , for $\alpha = (\alpha_1, \alpha_2, \dots)$ , 1.2
$P(n, r)$	the set of $\alpha \in P(n, r)$ such that $ \alpha  = r$ , 1.2
$\bar{\alpha}$	the partition associated to $\alpha \in P(n)$ , 1.2
$\lambda'$	the conjugate of the partition $\lambda$ , 1.2
$\lambda \cup \mu$	the partition obtained by arranging the parts of partitions $\lambda, \mu$ in descending order, 1.2
$R = \bigoplus_{\alpha \in P} R^{\alpha}$	the tensor algebra over $\bigwedge(E)$ , 1.2
$Q = \bigoplus_{\alpha \in P} Q^{\alpha}$	the tensor algebra over $\bigwedge(V)$ , 1.2
$J$	a certain homogeneous ideal in $R$ , 1.2
$I$	a certain homogeneous ideal in $Q$ , 1.2
$I_0(n, r)$	the set of $i \in I(n, r)$ which have distinct entries, 1.2
$I_1(n, r)$	the set of $i \in I(n, r)$ which have strictly decreasing entries, 1.2
$\text{Tab}(\lambda)$	the set of $\lambda$ -tableaux with entries in $[1, n]$ , 1.2
$\text{AStan}(\lambda)$	the set of anti-standard $\lambda$ -tableaux, 1.2
$\text{Tab}_0(\lambda)$	the set of $\lambda$ -tableaux $S$ such that the entries in each row of $S$ are distinct, 1.2
$\text{Tab}_1(\lambda)$	the set of $\lambda$ -tableaux $S$ such that the entries in each row of $S$ are strictly decreasing, 1.2
$\hat{e}_S$	$e_{S(1,1)} \wedge \cdots \wedge e_{S(1,\lambda_1)} \otimes e_{S(2,1)} \wedge \cdots \wedge e_{S(2,\lambda_2)} \otimes \cdots$ , for $S$ a $\lambda$ -tableau, 1.2
$X(r, s)$	the set of $\sigma \in \text{Sym}(r+s)$ such that $\sigma(a) < \sigma(b)$ whenever $a < b$ and $a, b \in [1, r]$ or $a, b \in [r+1, r+s]$ , 1.2
$(i : j)$	$\sum_{\pi \in \text{Sym}(r)} \text{sgn}(\pi) c_{i,j\pi}$ , for $i, j \in I(n, r)$ , 1.3
$(S : T)$	$(S^1 : T^1)(S^2 : T^2) \cdots (S^m : T^m)$ , where $S$ and $T$ are $\lambda$ -tableaux with rows $S^1, \dots, S^m$ and $T^1, \dots, T^m$ , 1.3
$\langle i : j \rangle$	$\sum_{\pi \in \text{Sym}(r)} (-q)^{l(\pi)} c_{i\pi,j}$ , for $i, j \in I(n, r)$ , 1.3
$\langle S : T \rangle$	$\langle S^1 : T^1 \rangle \langle S^2 : T^2 \rangle \cdots \langle S^m : T^m \rangle$ , where $S$ and $T$ are $\lambda$ -tableaux with rows $S^1, \dots, S^m$ and $T^1, \dots, T^m$ , 1.3

Chapter 2

$S(E), S(V)$	the (quantum) symmetric algebras over $E$ and $V$ , 2.1
$S^r(E), S^r(V)$	the $r$ th (quantum) symmetric powers of $E$ and $V$ , 2.1
$\bar{e}_i$	the image of $e_i$ under the natural map $E^{\otimes r} \rightarrow S^r E$ , 2.1
$\bar{v}_i$	the image of $v_i$ under the natural map $V^{\otimes r} \rightarrow S^r V$ , 2.1
$S^\alpha E$	$S^{\alpha_1} E \otimes S^{\alpha_2} E \otimes \dots$ , for $\alpha = (\alpha_1, \alpha_2, \dots)$ , 2.1
$S^\alpha V$	$S^{\alpha_1} V \otimes S^{\alpha_2} V \otimes \dots$ , for $\alpha = (\alpha_1, \alpha_2, \dots)$ , 2.1
$i \in \alpha$	$i \in I(n, r)$ has content $\alpha \in \Lambda(n, r)$ , 2.1
$i \sim j$	$i, j \in I(n, r)$ have the same content, 2.1
$i^\alpha$	$(1, \dots, 1, 2, \dots, 2, 3, \dots)$ , for $\alpha \in \Lambda(n, r)$ , 2.1
$j^\alpha$	$(\dots, 3, 2, \dots, 2, 1, \dots, 1)$ , for $\alpha \in \Lambda(n, r)$ , 2.1
$I^+(\alpha)$	the set of $(i_1, \dots, i_r) \in I(n, r)$ such that $i_1 \leq \dots \leq i_{\alpha_1}$ , $i_{\alpha_1+1} \leq \dots \leq i_{\alpha_1+\alpha_2}, \dots$ , for $\alpha = (\alpha_1, \dots, \alpha_r) \in \Lambda(n, r)$ , 2.1
$I^-(\alpha)$	the set of $(i_1, \dots, i_r) \in I(n, r)$ such that $i_1 \geq \dots \geq i_{\alpha_1}$ , $i_{\alpha_1+1} \geq \dots \geq i_{\alpha_1+\alpha_2}, \dots$ , for $\alpha = (\alpha_1, \dots, \alpha_r) \in \Lambda(n, r)$ , 2.1
$A(n, r)^\alpha$	the $k$ -span of the elements $c_{ij}$ with $j \in \alpha$ , 2.1
${}^\alpha A(n, r)$	the $k$ -span of the elements $c_{ij}$ with $i \in \alpha$ , 2.1
${}^\alpha A(n, r)^\beta$	the $k$ -span of the elements $c_{ij}$ with $i \in \alpha, j \in \beta$ , 2.1
$\xi_{ij}$	an element of a certain basis of $S(n, r)$ , 2.1
$\xi'_{ij}$	an element of a certain basis of $S(n, r)$ , 2.1
$\xi_\alpha$	$\xi_{i^\alpha i^\alpha}$ , for $\alpha \in \Lambda(n, r)$ , 2.1
$\omega$	$(1, \dots, 1) \in \Lambda(n, r)$ , 2.1
$u$	$(1, 2, \dots, r)$ , 2.1
$v$	$(r, \dots, 2, 1)$ , 2.1
$e$	$\xi_\omega$ , 2.1
$b_\sigma$	$\xi_{u, u\sigma}$ , for $\sigma \in \text{Sym}(r)$ , 2.1
$b'_\sigma$	$\xi'_{v\sigma, v}$ , for $\sigma \in \text{Sym}(r)$ , 2.1
$T_\sigma$	$b_{\sigma^{-1}}$ , for $\sigma \in \text{Sym}(r)$ , 2.1
$\text{Hec}(r), H(r), H$	$eS(n, r)e$ , 2.1 (and the abstract Hecke algebra in 0.19)
$f$	the Schur functor, 2.1 (and 0.18)
$X \in \mathcal{F}(\nabla)$	$X \in \text{mod}(G)$ admits a good filtration ( $\nabla$ -filtration), 2.1
$w_0$	the longest element of $\text{Sym}(n)$ , 2.1
$\lambda^*$	$-w_0\lambda$ , for $\lambda \in X(n)$ , 2.1
$\Delta(\lambda)$	$\nabla(\lambda^*)^*$ , for $\lambda \in X^+(n)$ , 2.1
$\nu$	the trivial representation of the Hecke algebra, $\nu(T_w) = q^{l(w)}$ , 2.1
$\varepsilon$	the sign representation of the Hecke algebra, $\varepsilon(T_w) = \text{sgn}(w)$ , 2.1
$k$	1-dimensional trivial module for a Hecke algebra, 2.1
$k_s$	1-dimensional sign module for a Hecke algebra, 2.1
$J(\alpha)$	the subset of $[1, r]$ defined by $\alpha \in \Lambda(n, r)$ , 2.1
$\text{Sym}(\alpha)$	the subgroup of $\text{Sym}(r)$ defined by $\alpha \in \Lambda(n, r)$ , 2.1
$H(\alpha)$	the subalgebra of $H(r)$ defined by $\alpha \in \Lambda(n, r)$ , 2.1

$x(\alpha)$	$\sum_{w \in \text{Sym}(\alpha)} T_w$ , 2.1
$y(\alpha)$	$\sum_{w \in \text{Sym}(\alpha)} (-q)^{N-l(w)} T_w$ , for $\alpha \in \Lambda(n, r)$ , where $N = \binom{n}{2}$ , 2.1
$\epsilon_i$	$(0, \dots, 0, 1, 0, \dots, 0)$ , 2.2
$X_0^+(n)$	the set of $\lambda = (\lambda_1, \dots, \lambda_m, 0, \dots, 0) \in X(n)$ with $\lambda_1, \dots, \lambda_m \neq 0$ (for some $m$ ), 2.2
$\lambda \subseteq \mu$	$J(\lambda) \subseteq J(\mu)$ , 2.2

Chapter 3

$G_1$	infinitesimal subgroup of $G$ , 3.1
$B_1, B_1^+, T_1$	infinitesimal subgroups $B \cap G_1, B^+ \cap G_1, T \cap G_1$ of $B, B^+, T$ , 3.1
$\hat{G}_1$	Jantzen subgroup of $G$ , 3.1
$\hat{B}_1, \hat{B}_1^+$	Jantzen subgroups $\hat{G}_1 \cap B, \hat{G}_1 \cap B_1^+$ of $B, B^+$ , 3.1
$X_1$	the set of $\lambda = (\lambda_1, \dots, \lambda_n) \in X$ such that $0 \leq \lambda_1 - \lambda_2, \dots, \lambda_{n-1} - \lambda_n, \lambda_n < l$ , 3.1
$ H $	the order of a finite quantum group $H$ , 3.1
$[H : J]$	the index $ H / J $ of a finite quantum subgroup in a finite quantum group $H$ , 3.1
$I_1(\lambda)$	the injective hull of the $B_1^+$ -module $k_\lambda$ , 3.1
$\hat{I}_1(\lambda)$	the injective hull of the $\hat{B}_1^+$ -module $k_\lambda$ , 3.1
$\chi(\lambda)$	Weyl character and Schur symmetric function, 3.1
$\nabla_1(\lambda)$	$\text{Ind}_{B_1^+}^{G_1} k_\lambda$ , 3.1
$\hat{\nabla}_1(\lambda)$	$\text{Ind}_{\hat{B}_1^+}^{\hat{G}_1} k_\lambda$ , 3.1
$L_1(\lambda)$	the (simple) socle of the $G_1$ -module $\nabla_1(\lambda)$ , 3.1
$\hat{L}_1(\lambda)$	the (simple) socle of the $\hat{G}_1$ -module $\hat{\nabla}_1(\lambda)$ , 3.1
$w \cdot \lambda$	the “dot” action, i.e. $w \cdot \lambda = w(\lambda + \rho) - \rho$ for $w \in \text{Sym}(n), \lambda \in X$ , 3.1
$\bar{G}$	ordinary $\text{GL}_n$ , regarded as a $k$ -group, 3.2
$F : G \rightarrow \bar{G}$	the (quantum) Frobenius morphism, 3.2
$Q_1(\lambda)$	the injective envelope of the $G_1$ -module $L_1(\lambda)$ , for $\lambda \in X$ , 3.2
$\hat{Q}_1(\lambda)$	the injective envelope of the $\hat{G}_1$ -module $\hat{L}_1(\lambda)$ , for $\lambda \in X$ , 3.2
$V \in \mathcal{F}(\hat{\nabla}_1)$	$V$ is a $\hat{G}_1$ -module which admits a filtration with sections of the form $\hat{\nabla}_1(\lambda), \lambda \in X$ , 3.2
$T(\lambda)$	indecomposable tilting module with highest weight $\lambda$ , 3.3
$t(\lambda)$	$(l-1)\delta + l\lambda$ , where $\delta = (n-1, \dots, 1, 0)$ , 3.3
$\bar{F} : \bar{G} \rightarrow \bar{G}$	the ordinary Frobenius morphism, 3.4

## Chapter 4

$\bigwedge(E \otimes V)$	exterior algebra on $E \otimes V$ , 4.1
$J$	a certain antiautomorphism of $H(r)$ and $S(n, r)$ , 4.1
$U^\circ$	the contravariant dual of an $H(r)$ -module or $S(n, r)$ -module $U$ , 4.1
$G_\Sigma$	a subgroup of the quantum general linear group defined by a set $\Sigma$ of simple roots, 4.2
$L_\Sigma(\lambda)$	simple $G_\Sigma$ -module of highest weight $\lambda$ , 4.2
$A(\pi)$	a generalized Schur coalgebra, 4.2
$S(\pi)$	a generalized Schur algebra, 4.2
$e_1, e_2, \dots$	elementary symmetric functions, 4.3
$h_1, h_2, \dots$	complete symmetric functions, 4.3
$s_\lambda$	Schur symmetric function, 4.3
$i(\lambda)$	the image of $\lambda$ under a certain bijection $\Lambda^+(n, r)_{\text{row}} \rightarrow \Lambda^+(n, r)_{\text{col}}$ , 4.3
$Y(\lambda)$	the Young module labelled by $\lambda$ , 4.4
$Y_s(\lambda)$	the signed Young module labelled by $\lambda$ , 4.4
$\text{Sp}(\lambda)$	the Specht module labelled by $\lambda$ , 4.4
$D(\lambda)$	irreducible $H(r)$ -module labelled by $\lambda$ , 4.4
$\#$	a certain antiautomorphism of $H(r)$ , 4.4
$A(\nu)$	$k[M(\nu)]$ , for $\nu$ a composition of $n$ , 4.6
$A(\nu, \rho)$	$\rho$ th component of the graded algebra $A(\nu)$ , 4.6
$S(\nu, \rho)$	algebra dual of the coalgebra $A(\nu, \rho)$ , 4.6
$D^\lambda E$	divided powers module, 4.8
$\text{inj}(X)$	the injective dimension of a module $X$ , 4.8
$\text{proj}(X)$	the projective dimension of a module $X$ , 4.8
$\text{glob}(S)$	the global dimension of an algebra $S$ , 4.8

## Appendix

$L(\lambda)$	simple $S$ -module labelled by $\lambda \in \Lambda^+$ , A1
$P(\lambda)$	projective cover of $L(\lambda)$ , A1
$I(\lambda)$	injective envelope of $L(\lambda)$ , A1
$\text{mod}(S)$	category of finite dimensional left $S$ -modules, A1
$[X : L(\lambda)]$	multiplicity of $L(\lambda)$ as a composition factor of $X \in \text{mod}(S)$ , A1
$\pi$	a subset of $\Lambda^+$ , A1
$O_\pi(V)$	the largest submodule of $V$ belonging to $\pi$ , A1
$O^\pi(V)$	the smallest submodule of $V$ such that $V/O^\pi(V)$ belongs to $\pi$ , A1

$S(\pi)$	$S/O^\pi(S)$ , A1
$S_\xi$	$\xi S\xi$ , for an idempotent $\xi \in S$ , A1
$fV$	$\xi V \in \text{mod}(S_\xi)$ , for $V \in \text{mod}(S)$ , A1
$\Lambda_\xi^+$	$\{\lambda \in \Lambda^+ \mid \xi L(\lambda) \neq 0\}$ , A1
$V^*$	$\text{Hom}_k(V, k)$ regarded as a left $S^{\text{op}}$ -module (for $V \in \text{mod}(S)$ ), A1
$\leq$	a partial order on $\Lambda^+$ , A1
$M(\lambda)$	the maximal submodule of $P(\lambda)$ , A1
$\pi(\lambda)$	$\{\mu \in \Lambda^+ \mid \mu < \lambda\}$ , A1
$K(\lambda)$	$O^{\pi(\lambda)}(M(\lambda))$ , A1
$\Delta(\lambda)$	$P(\lambda)/K(\lambda)$ , A1
$\nabla(\lambda)$	defined by $\nabla(\lambda)/L(\lambda) = O_{\pi(\lambda)}(I(\lambda)/L(\lambda))$ , A1
$\text{Grot}(S)$	the Grothendieck group of finite dimensional left $S$ -modules, A1
$[X]$	the class of $X \in \text{mod}(S)$ in $\text{Grot}(S)$ , A1
$(X : \Delta(\lambda))$	defined by $[X] = \sum_{\lambda \in \Lambda^+} (X : \Delta(\lambda))[\Delta(\lambda)]$ , for $X \in \text{mod}(S)$ , A1
$(X : \nabla(\lambda))$	defined by $[X] = \sum_{\lambda \in \Lambda^+} (X : \nabla(\lambda))[\nabla(\lambda)]$ , for $X \in \text{mod}(S)$ , A1
$\mathcal{F}(\Delta)$	the class of finite dimensional left $S$ -modules which admit a filtration with sections from $\{\Delta(\lambda) \mid \lambda \in \Lambda^+\}$ , A1
$\mathcal{F}(\nabla)$	the class of finite dimensional left $S$ -modules which admit a filtration with sections from $\{\nabla(\lambda) \mid \lambda \in \Lambda^+\}$ , A1
$l(\lambda)$	length of a longest chain $\lambda_0 < \lambda_1 < \dots < \lambda_l = \lambda$ in $\Lambda^+$ , A2
$l(\Lambda^+)$	the maximum value of $l(\lambda)$ , $\lambda \in \Lambda^+$ , A2
$R^i O_\pi$	right derived functors of $O_\pi$ , A3
$\theta : \Lambda \rightarrow S$	a theory of weights, A3
$\xi_\alpha$	$\theta(\alpha)$ , for $\alpha \in \Lambda$ , A3
$\xi_\Gamma$	$\sum_{\alpha \in \Gamma} \xi_\alpha$ , for $\Gamma \subseteq \Lambda$ , A3
$\mathcal{F}_\pi(\Delta)$	the class of finite dimensional dimensional left $S$ -modules which admit a filtration with sections from $\{\Delta(\lambda) \mid \lambda \in \pi\}$ , A3
$T(\lambda)$	the indecomposable tilting module labelled by $\lambda \in \Lambda^+$ , A4
$\text{supp}(X)$	the support of $X \in \mathcal{F}(\nabla)$ , i.e. the set of $\lambda \in \Lambda^+$ such that $\lambda \leq \mu$ for some $\mu \in \Lambda^+$ such that $(X : \nabla(\mu)) \neq 0$ , A4
$S'$	the Ringel dual of $S$ , A4
$\leq'$	the order on $\Lambda^+$ opposite to the given order $\leq$ , A4

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