Index of notation

Chapter 0

	basis of $A(n,r)$, 0.14
ξ_α	ξ_{ii}, where $i \in I(n,r)$ has content α, 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 λ, 0.15
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_λ	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
$\nabla(\lambda)$	$\mathrm{Ind}_{B(n)}^{G(n)} k_\lambda$, 0.16
$\bigwedge^\alpha E$	$\bigwedge^{\alpha_1} E \otimes \bigwedge^{\alpha_2} E \otimes \cdots$ (for $\alpha = (\alpha_1, \alpha_2, \ldots)$), 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
$\Lambda^+(n,r)_{\mathrm{col}}$	set of column regular partitions, 0.18
$\Lambda^+(n,r)_{\mathrm{row}}$	set of row regular partitions, 0.18
ω	$(1,1,\ldots,1) \in \Lambda(n,r)$, 0.18
e	ξ_ω, 0.18
f	the Schur functor, 0.18 (and 2.1)
$\mathrm{Hec}(r)$	the Hecke algebra of $\mathrm{Sym}(r)$, 0.19 (and $eS(n,r)e$ in 2.1)
$l(w)$	the length of $w \in \mathrm{Sym}(r)$, 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
$\nabla_q(\lambda)$	$\mathrm{Ind}_{B_q(n)}^{G_q(n)} k_\lambda$, 0.21
$L_q(\lambda)$	the socle of $\nabla_q(\lambda)$, 0.21

Chapter 1

$\mathrm{cf}(E)$	the coefficient space of a comodule E, 1.1
E^*, V^*	dual comodules, 1.1
$\mathrm{ad}(\phi)$	the adjoint of the linear map ϕ, 1.1
$[a,b]$	$\{a, a+1, \ldots, b\}$, 1.2
$\mathrm{Sym}(X)$	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 rth (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 $i = (i_1, \ldots, i_r) \in I(n,r)$, 1.2
v_i	$v_{i_1} \otimes \cdots \otimes v_{i_r} \in V^{\otimes r}$, for $i = (i_1, \ldots, i_r) \in I(n,r)$, 1.2
$\hat{e}_i$	the image of e_i under the natural map $E^{\otimes r} \to \bigwedge^r E$, 1.2
$\hat{v}_i$	the image of v_i under the natural map $V^{\otimes r} \to \bigwedge^r V$, 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 $\alpha = (\alpha_1, \alpha_2, \ldots)$, 1.2
$\bigwedge^\alpha V$	$\bigwedge^{\alpha_1} V \otimes \bigwedge^{\alpha_2} V \otimes \cdots$, for $\alpha = (\alpha_1, \alpha_2, \ldots)$, 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
λ'	the conjugate of the partition λ, 1.2
$\lambda \bigcup \mu$	the partition obtained by arranging the parts of partitions λ, μ 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
$\mathrm{Tab}(\lambda)$	the set of λ-tableaux with entries in $[1,n]$, 1.2
$\mathrm{AStan}(\lambda)$	the set of anti-standard λ-tableaux, 1.2
$\mathrm{Tab}_0(\lambda)$	the set of λ-tableaux S such that the entries in each row of S are distinct, 1.2
$\mathrm{Tab}_1(\lambda)$	the set of λ-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 λ-tableau, 1.2
$X(r,s)$	the set of $\sigma \in \mathrm{Sym}(r+s)$ 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
$(i:j)$	$\sum_{\pi \in \mathrm{Sym}(r)} \mathrm{sgn}(\pi) c_{i,j\pi}$, for $i, j \in I(n,r)$, 1.3
$(S:T)$	$(S^1 : T^1)(S^2 : T^2) \ldots (S^m : T^m)$, where S and T are λ-tableaux with rows $S^1, \ldots, S^m$ and $T^1, \ldots, T^m$, 1.3
$\langle i:j \rangle$	$\sum_{\pi \in \mathrm{Sym}(r)} (-q)^{l(\pi)} c_{i\pi,j}$, for $i, j \in I(n,r)$, 1.3
$\langle S:T \rangle$	$\langle S^1 : T^1 \rangle \langle S^2 : T^2 \rangle \ldots \langle S^m : T^m \rangle$, where S and T are λ-tableaux with rows $S^1, \ldots, S^m$ and $T^1, \ldots, T^m$, 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 rth (quantum) symmetric powers of E and V, 2.1
$\bar{e}_i$	the image of e_i under the natural map $E^{\otimes r} \to S^r E$, 2.1
$\bar{v}_i$	the image of v_i under the natural map $V^{\otimes r} \to S^r V$, 2.1
$S^\alpha E$	$S^{\alpha_1} E \otimes S^{\alpha_2} E \otimes \cdots$, for $\alpha = (\alpha_1, \alpha_2, \ldots)$, 2.1
$S^\alpha V$	$S^{\alpha_1} V \otimes S^{\alpha_2} V \otimes \cdots$, for $\alpha = (\alpha_1, \alpha_2, \ldots)$, 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^α	$(1, \ldots, 1, 2 \ldots, 2, 3, \ldots)$, for $\alpha \in \Lambda(n,r)$, 2.1
j^α	$(\ldots, 3, 2, \ldots, 2, 1, \ldots, 1)$, for $\alpha \in \Lambda(n,r)$, 2.1
$I^+(\alpha)$	the set of $(i_1, \ldots, i_r) \in I(n,r)$ such that $i_1 \le \cdots \le i_{\alpha_1}$, $i_{\alpha_1+1} \le \cdots \le i_{\alpha_1+\alpha_2}, \ldots$, for $\alpha = (\alpha_1, \ldots, \alpha_r) \in \Lambda(n,r)$, 2.1
$I^-(\alpha)$	the set of $(i_1, \ldots, i_r) \in I(n,r)$ such that $i_1 \ge \cdots \ge i_{\alpha_1}$, $i_{\alpha_1+1} \ge \cdots \ge i_{\alpha_1+\alpha_2}, \ldots$, for $\alpha = (\alpha_1, \ldots, \alpha_r) \in \Lambda(n,r)$, 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
ξ_{ij}	an element of a certain basis of $S(n,r)$, 2.1
ξ'_{ij}	an element of a certain basis of $S(n,r)$, 2.1
ξ_α	$\xi_{i^\alpha i^\alpha}$, for $\alpha \in \Lambda(n,r)$, 2.1
ω	$(1, \ldots, 1) \in \Lambda(n,r)$, 2.1
u	$(1, 2, \ldots, r)$, 2.1
v	$(r, \ldots, 2, 1)$, 2.1
e	ξ_ω, 2.1
b_σ	$\xi_{u,u\sigma}$, for $\sigma \in \mathrm{Sym}(r)$, 2.1
b'_σ	$\xi'_{v\sigma,v}$, for $\sigma \in \mathrm{Sym}(r)$, 2.1
T_σ	$b_{\sigma^{-1}}$, for $\sigma \in \mathrm{Sym}(r)$, 2.1
$\mathrm{Hec}(r), H(r), H$	$eS(n,r)e$, 2.1 (and the abstract Hecke algebra in 0.19)
f	the Schur functor, 2.1 (and 0.18)
$X \in \mathcal{F}(\nabla)$	$X \in \mathrm{mod}(G)$ admits a good filtration (∇-filtration), 2.1
w_0	the longest element of $\mathrm{Sym}(n)$, 2.1
λ^*	$-w_0\lambda$, for $\lambda \in X(n)$, 2.1
$\Delta(\lambda)$	$\nabla(\lambda^*)^*$, for $\lambda \in X^+(n)$, 2.1
ν	the trivial representation of the Hecke algebra, $\nu(T_w) = q^{l(w)}$, 2.1
ε	the sign representation of the Hecke algebra, $\varepsilon(T_w) = \mathrm{sgn}(w)$, 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
$\mathrm{Sym}(\alpha)$	the subgroup of $\mathrm{Sym}(r)$ 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

$x(\alpha)$	$\sum_{w\in\mathrm{Sym}(\alpha)} T_w$, 2.1
$y(\alpha)$	$\sum_{w\in\mathrm{Sym}(\alpha)}(-q)^{N-l(w)}T_w$, for $\alpha\in\Lambda(n,r)$, where $N=\binom{n}{2}$, 2.1
ϵ_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_λ, 3.1
$\hat{I}_1(\lambda)$	the injective hull of the $\hat{B}_1^+$-module k_λ, 3.1
$\chi(\lambda)$	Weyl character and Schur symmetric function, 3.1
$\nabla_1(\lambda)$	$\mathrm{Ind}_{B_1}^{G_1}k_\lambda$, 3.1
$\hat{\nabla}_1(\lambda)$	$\mathrm{Ind}_{\hat{B}_1}^{\hat{G}_1}k_\lambda$, 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 $w\in\mathrm{Sym}(n),\lambda\in X$, 3.1
$\bar{G}$	ordinary GL_n, regarded as a k-group, 3.2
$F:G\to\bar{G}$	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 λ, 3.3
$t(\lambda)$	$(l-1)\delta+l\lambda$, where $\delta=(n-1,\dots,1,0)$, 3.3
$\bar{F}:\bar{G}\to\bar{G}$	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°	the contravariant dual of an $H(r)$-module or $S(n,r)$-module U, 4.1
G_Σ	a subgroup of the quantum general linear group defined by a set Σ of simple roots, 4.2
$L_\Sigma(\lambda)$	simple G_Σ-module of highest weight λ, 4.2
$A(\pi)$	a generalized Schur coalgebra, 4.2
$S(\pi)$	a generalized Schur algebra, 4.2
$e_1, e_2, \ldots$	elementary symmetric functions, 4.3
$h_1, h_2, \ldots$	complete symmetric functions, 4.3
s_λ	Schur symmetric function, 4.3
$i(\lambda)$	the image of λ under a certain bijection $\Lambda^+(n,r)_{\text{row}} \to \Lambda^+(n,r)_{\text{col}}$, 4.3
$Y(\lambda)$	the Young module labelled by λ, 4.4
$Y_s(\lambda)$	the signed Young module labelled by λ, 4.4
$\mathrm{Sp}(\lambda)$	the Specht module labelled by λ, 4.4
$D(\lambda)$	irreducible $H(r)$-module labelled by λ, 4.4
#	a certain antiautomorphism of $H(r)$, 4.4
$A(\nu)$	$k[M(\nu)]$, for ν a composition of n, 4.6
$A(\nu,\rho)$	ρth 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
$\mathrm{inj}(X)$	the injective dimension of a module X, 4.8
$\mathrm{proj}(X)$	the projective dimension of a module X, 4.8
$\mathrm{glob}(S)$	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
$\mathrm{mod}(S)$	category of finite dimensional left S-modules, A1
$[X : L(\lambda)]$	multiplicity of $L(\lambda)$ as a composition factor of $X \in \mathrm{mod}(S)$, A1
π	a subset of Λ^+, A1
$O_\pi(V)$	the largest submodule of V belonging to π, A1
$O^\pi(V)$	the smallest submodule of V such that $V/O^\pi(V)$ belongs to π, A1

Subject Index