

– Notation Index –

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Below is a list of symbols which will be used in the lecture, together with the corresponding english terminology. This list will be updated during the lecture with the new notation introduced.

**General symbols**

$\mathbb{C}$	field of complex numbers
$\mathbb{F}_q$	finite field with $q$ elements
$i$	$\sqrt{-1}$ in $\mathbb{C}$
$\text{Id}_M$	identity map on the set $M$
$\text{Im}(f)$	image of the map $f$
$\ker(\varphi)$	kernel of the morphism $\varphi$
$\mathbb{N}$	the natural numbers without 0
$\mathbb{N}_0$	the natural numbers with 0
$\mathbb{P}$	the prime numbers in $\mathbb{Z}$
$\mathbb{Q}$	field of rational numbers
$\mathbb{R}$	field of real numbers
$\mathbb{Z}$	ring of integer numbers
$\mathbb{Z}_{\geq a}, \mathbb{Z}_{>a}, \mathbb{Z}_{\leq a}, \mathbb{Z}_{<a}$	$\{m \in \mathbb{Z} \mid m \geq a \text{ (resp. } m > a, m \leq a, m < a)\}$
$ X $	cardinality of the set $X$
$\delta_{ij}$	Kronecker's delta
$\cup$	union
$\coprod$	disjoint union
$\cap$	intersection
$\sum$	summation symbol
$\prod, \times$	cartesian product
$\oplus$	direct sum
$\otimes$	tensor product
$\emptyset$	empty set
$\forall$	for all
$\exists$	there exists
$\cong$	isomorphism
$\bar{a}$	complex conjugate of $a \in \mathbb{C}$
$a \mid b, a \nmid b$	$a$ divides $b$ , $a$ does not divide $b$
$f _S$	restriction of the map $f$ to the subset $S$

**Group theory**

$A_n$	alternating group on $n$ letters
$C_m$	cyclic group of order $m$ in multiplicative notation
$C_G(x)$	centraliser of $x$ in $G$
$C(G)$	set of conjugacy classes of $G$
$D_{2n}$	dihedral group of order $2n$
$\text{Fix}_X(g)$	set of fixed points of $g$ on $X$
$[G, G]$ or $G'$	commutator subgroup of $G$
$G/N$	quotient group $G$ modulo $N$
$\text{GL}_n(K)$	general linear group over $K$
$H \leq G, H < G$	$H$ is a subgroup of $G$ , resp. a proper subgroup
$N \trianglelefteq G$	$N$ is a normal subgroup of $G$
$N_G(H)$	normaliser of $H$ in $G$
$\text{PGL}_n(K)$	projective linear group over $K$
$Q_8$	quaternion group of order 8

$S_n$	symmetric group on $n$ letters
$SL_n(K)$	special linear group over $K$
$Syl_p(G)$	set of Sylow $p$ -subgroups of the group $G$
$Z(G)$	centre of the group $G$
$\mathbb{Z}/m\mathbb{Z}$	cyclic group of order $m$ in additive notation
$ G $	order of the group $G$
$ G : H $	index of $H$ in $G$
$[x]$	conjugacy class of $x$
$[g, h]$	commutator of $g$ and $h$
$\langle g \rangle$	cyclic group generated by $g$
$\langle g \mid g^m = 1 \rangle$	cyclic group of order $m$ generated by $g$

## Rings and linear algebra

$R[X]$	ring of polynomials in an indeterminate $X$ over the ring $R$
$R^\times$	group of units of the ring $R$
$\text{char}(K)$	characteristic of the field $K$
$\det$	determinant of a matrix/linear transformation
$\dim_K$	$K$ -dimension
$\text{End}_K(V)$	endomorphism ring of the $K$ -vector space $V$
$GL(V)$	set of invertible linear transformations of the vector space $V$
$\langle x_1, \dots, x_n \rangle_K$	$K$ -linear span of the set $\{x_1, \dots, x_n\}$
$M_{n \times m}(K)$	ring of $n \times m$ -matrices with coefficients in $K$
$M_n(K)$	ring of $n \times n$ -matrices with coefficients in $K$
$\overline{K}$	algebraic closure of the field $K$
$\text{Tr}$	trace of a matrix/linear transformation
$W \leq V$	$W$ is a $K$ -subspace of $V$
$\{e_1, \dots, e_n\}$	standard basis of $K^n$
$(e_1, \dots, e_n)$	standard ordered basis of $K^n$

## Representations and characters

$C_1, \dots, C_r$	the conjugacy classes of $G$
$\widehat{C}_1, \dots, \widehat{C}_r$	the class sums of $G$
$\mathfrak{C}\mathfrak{I}(G)$	$\mathbb{C}$ -vector space of class functions on $G$
$\text{Inf}_{G/N}^G$	inflation from $G/N$ to $G$
$\text{Irr}(G) = \{\chi_1, \dots, \chi_r\}$	set of irreducible characters of $G$
$\ker(\chi)$	kernel of the characters of $\chi$
$K^G$	space of $K$ -valued functions of $G$
$m_{jkl}$	class multiplication constants of $G$
$Z(\chi)$	center of the character $\chi$
$\rho \sim \rho'$	$\rho$ is equivalent to $\rho'$
$\rho_{\text{reg}}$	the regular representation of $G$
$\rho_V$	representation associated to the $G$ -vector space $V$
$\chi_{\text{reg}}$	regular character of $G$
$\chi_V$	character of the $G$ -vector space $V$
$\omega_1, \dots, \omega_r$	the central characters of $G$
$\langle -, - \rangle$	scalar product on $\mathfrak{C}\mathfrak{I}(G)$
$1_G$	trivial character of $G$

## Greek Alphabet

lower-case letter	upper-case letter	Name
$\alpha$	A	alpha
$\beta$	B	beta
$\gamma$	$\Gamma$	gamma
$\delta$	$\Delta$	delta
$\varepsilon, \epsilon$	E	epsilon
$\zeta$	Z	zeta
$\eta$	H	eta
$\theta$	$\Theta$	theta
$\iota$	I	iota
$\kappa$	K	kappa
$\lambda$	$\Lambda$	lambda
$\mu$	M	mu
$\nu$	N	nu
$\xi$	$\Xi$	xi
$\omicron$	O	omicron
$\pi, \varpi$	$\Pi$	pi
$\rho, \varrho$	P	rho
$\sigma, \varsigma$	$\Sigma$	sigma
$\tau$	T	tau
$\upsilon$	$\Upsilon$	upsilon
$\phi, \varphi$	$\Phi$	phi
$\chi$	X	chi
$\psi$	$\Psi$	psi
$\omega$	$\Omega$	omega