LIST OF SYMBOLS

In parentheses page number of first appearance of symbol.

abs = absolute value (41)

a.e. = almost everywhere (101)

$AS(n)$ = all real $n \times n$ skew symmetric matrices (145)

$A(X)$ = coefficient matrix of vector field X (70)

$\mathcal{B}$, $\mathcal{B}_0$ = σ-ring of Borel, Baire sets (102)

c_n = constant defined in (7.7.9) (147)

$c(r)$ = constant defined in (9.2.14) (167)

C = nonsingular matrix (16)

or: class of Cartan G-spaces (210)

CP = both Cartan and proper action (210)

C^k, C^∞ = differentiability classes (39)

χ, χ^2 = chi, chi-square distribution (2,1)

χ_ℓ, χ_r = left, right multipliers (127)

det = determinant (41)

diag = diagonal or block diagonal matrix (15, 20)

dim = dimension (44)

df = differential of mapping f (44)

(dC) = wedge product of elements of dC (145)

$d(\cdot,\cdot)$ = distance function in metric space (14)

$\frac{\partial(y)}{\partial(x)}$ = Jacobian (with abs: 41, without abs: 60)

δ_{ij} = Kronecker delta (46)

δf = adjoint of df (63)

$\delta(a)$ = modulus of automorphism a (126)

Δ_r, Δ_r^G, Δ_ℓ, Δ_ℓ^G = right- and left-hand moduli of group G (122)

E_{ij} = matrix with 1 in position (i,j) (70)

e, e_G = identity element of group G (14, 15)

$\exp(x) = e^x$ if x is a real number (2)

$\exp(X)$ = exponential map when X is a vector field (83)

f^+, f^- = positive, negative part of a real valued function f (100)

$\int f\omega = \mu(f)$ with μ defined by the differential form ω (117)

$f^\flat$ = function on X/H derived from f on X (132)

$\mathfrak{F}$ = vector lattice (99)

$\mathfrak{F}^o$, $\mathfrak{F}_u$ = over-, under-functions of $\mathfrak{F}$(99)

$\mathfrak{F}(Z;E)$ = all functions from Z to E (110)

gf = g-translate of the function f (21)

$[g] = gH$ = coset of g in G/H (19)

$GL(n)$ = general linear group of all real $n\times n$ nonsingular matrices(14)

G/H = space of left cosets of $G \bmod H$ (19)

G_k = group of permutations of $1,\dots,k$ (54)

G_x = isotropy subgroup of G at x (20)

$\mathfrak{g}$, $\mathfrak{h}$ = Lie algebra of G, H, etc. (69)

$\mathfrak{gl}(n)$ = Lie algebra of $GL(n)$ consisting of all $n \times n$ real matrices (70)

γ_X = integral curve of X starting at e (83)

Γ = orthogonal matrix (3)

or: gamma function (147)

iid = independent and identically distributed (2)

$I_n = n \times n$ identity matrix (15)

$I(f)$ = elementary integral (99)

$\bar{I}(f)$, $\underline{I}(f)$ = upper, lower integral (100)

i_X = identity map $X \to X$ (13)

i = inclusion map (48)

inf = infimum (100)

$\mathcal{K}(X)$ = all real valued continuous functions on X with compact support (25)

$\mathcal{K}_+(X)$ = nonnegative members of $\mathcal{K}(X)$ (103)

$\mathcal{K}(X, K)$ = members f of $\mathcal{K}(X)$ with $\operatorname{supp} f \subset K$ (103)

$\mathcal{K}(Z, K; E)$ = all continuous $f : Z \to E$ with $\operatorname{supp} f \subset K$ (110)

$LT(n)$ = all $n \times n$ real lower triangular matrices with positive diagonal elements (15)

L_g = left translation by g (52)

l.c. = locally compact (25)

$\mathcal{L}$ = family of integrable functions (100)

$M(m, n)$ = all $m \times n$ real matrices (145)

M_p = tangent space at $p \in M$ (43)

M_p^* = dual space to M_p (53)

$\mathcal{M}$ = real valued functions with finite semi-norm (101)

$\mu(f) = \int f d\mu$ (103)

μ_G = left Haar measure on G (137, 146)

μ_Y = invariant measure induced on a coset space Y (139)

$\mu^\flat$ = measure on X/H derived from μ on X (134)

μ/β = quotient measure (135)

$N(0,1)$ = standard normal distribution (2)

$N(\mu,\Sigma)$ = multivariate normal distribution with mean μ and covariance matrix Σ (166)

ν_G = right Haar measure on G (146)

$\nu^\sharp$ = measure on X derived from ν on X/H (135)

$O(n)$ = all $n \times n$ orthogonal matrices (3)

$\emptyset$ = empty set (31)

ω, ω_p = differential form, at p (53)

P = probability (151)

or: denotes proper action (210)

P^T = distribution of random variable T (155)

$PD(n)$ = all $n \times n$ positive definite matrices (18)

pr_1 = projection of product space on first component space (13)

π = orbit projection $X \to X/G$ or coset projection $G \to G/H$ (18, 19)

or: the number 3.14159... (2)

R = real line (5)

R_+, R_- = all positive, negative real numbers (25, 28)

R^n = n-dimensional Euclidean space (14)

R_+^* = group of positive reals under multiplication (14)

R_g = right translation by g (67)

$\text{sgn}\, x$ = 1, 0, or -1 according as $x >, =,$ or < 0 (22)

$\text{sgn}(\pi)$ = ± 1 according as the permutation π is even or odd (54)

sup = supremum (100)

supp = support of a real valued continuous function (25)

S = a positive definite matrix (3)

or: family of measurable sets (100)

or: slice or local cross section (200)

tr = trace of a matrix (165)

$\mathcal{T}$ = range of a maximal invariant (152)

$UT(n)$ = all $n \times n$ real upper triangular matrices with positive diagonal elements (15)

V_k = space of k-linear alternating functions (54)

V = Grassmann algebra (54)

WLOG = without loss of generality (63)

$W(n, \Sigma)$ = Wishart distribution (166)

X/G = orbit space of X under the action of G (18)

$\mathcal{X}$ = statistical sample space (151)

$\mathcal{Y}$ = coset space G/G_0 (153)

$\mathcal{Z}$ = cross section (152)

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$\bar{A}$ = closure of a set A (23)

A^c = complement of a set A (23)

A^o = interior of a set A (23)

∂A = boundary of a set A (23)

A' = transpose of the matrix A (3)

$((a_{ij}))$ = matrix A whose (i, j) element is a_{ij} (41)

$((A, B))$ = set of all g such that gA meets B (31)

$|c|$ = absolute value of the real number c (13)

$|f|$ = absolute value of the real valued function f (101)

$|C|$ = absolute value of the determinant of the matrix C (145)

$\| \ \|$ = norm (13)

$f_1 \circ f_2$ = composition of the functions f_1, f_2 (13)

$f_1 \otimes f_2$ = function whose value at (x, y) is $f_1(x)f_2(y)$ (13)

$\mu_1 \otimes \mu_2$ = product measure (115)

$X \times Y$ = product space (13)

$\oplus$ = direct sum (54)

$[X, Y]$ = bracket of the vector fields X, Y (51)

$[\Gamma_1, \Gamma_2]$ = partitioning of a matrix Γ (150)

$\wedge$ = wedge product (54)