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List of Symbols

$[X, Y]$	Lie bracket of two vector fields X and Y, page 12
$\lvert\mathrm{Hess}(u)\rvert$	norm of $\mathrm{Hess}(u)$, page 19
$\lvert X\rvert$	norm of the vector field X, page 19
$\lvert x\rvert$	distance of the point $x \in \mathbb{R}^m$ from the origin 0, page 211
$\bigwedge^2(U)$	space of skew-symmetric 2-forms, page 14
$C^\infty(M)$	set of smooth functions defined on M, page 16
(U, φ)	local chart, page 8
Δu	Laplacian of the function u, page 18
δ_i^j	suggestive version of the Kronecker symbol, page 8
δ_{ij}	Kronecker symbol, page 8
$\dot{\gamma}$	tangent vector of the curve γ, page 22
$x^1, \ldots, x^m$	coordinate functions, page 8
$\frac{\partial u}{\partial \nu}$	directional derivative of the function u in the direction of ν, page 62
$\mathrm{Hess}(u)$	Hessian of the function u, page 18
$\lambda_1^{L_H}(\Omega)$	first eigenvalue of the operator L_H on the bounded domain Ω, page 74
$\lambda_1^{L_H}(M)$	first eigenvalue of the operator L_H on the Riemannian manifold M, page 74
$\mathcal{L}_X \langle\ ,\ \rangle$	Lie derivative of the metric $\langle\ ,\ \rangle$ in the direction of X, page 13

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$\mathcal{L}_X\omega$	Lie derivative of the 1-form ω in the direction of X, page 13
$\mathcal{L}_X f$	Lie derivative of the function f in the direction of X, page 13
$\mathcal{L}_X Y$	Lie derivative of the vector field Y in the direction of X, page 13
$\mathbb{B}^m$	unit ball of $\mathbb{R}^m$, page 71
$\mathbb{B}^m_R(0)$	open disk of radius R centered at the origin in $T_oM \approx \mathbb{R}^m$, page 54
$\mathbb{H}^m$	standard hyperbolic space of dimension m, page 47
$\mathbb{H}^m_{-H^2}$	hyperbolic space of constant sectional curvature $-H^2$, page 75
$\mathbb{S}^m$	standard sphere of dimension m, page 47
$\mathbb{S}^m_+$	standard upper hemisphere, page 53
$\mathbb{S}^m_+\left(\sqrt{k}\right)$	upper hemisphere of radius $k^{-1/2}$, page 63
$\mathbb{S}^m_{k^2}$	sphere of constant sectional curvature k^2, page 61
$\mathfrak{X}(M)$	set of smooth vector fields on M, page 10
$\mathrm{Ann}_{\eta,1}$	annulus $B_1 \setminus \overline{B}_\eta$, page 214
$\mathrm{cut}(o)$	cut locus of the point o, page 21
II	second fundamental tensor, page 33
$\langle\ ,\ \rangle_{ij}$	(local) components of the metric, page 8
$\nabla\omega$	covariant derivative of the 1-form ω, page 11
∇f	gradient of the function f, page 11
∇X	covariant derivative of the vector field X, page 10
$\nabla_Y\omega$	covariant derivative of ω in the direction of Y, page 11
$\nabla_Y X$	covariant derivative of X in the direction of Y, page 10
$\|f\|_\infty$	L^∞-norm of the function f, page 153
ω_m	volume of the unit sphere in $\mathbb{R}^m$, page 28
ω_{ik}	covariant derivative of the coefficient ω_i, page 11

$\mathrm{Conf}(M)$	group of conformal diffeomorphisms on M, page 146
$\dim(M)$	dimension of the manifold M, page 8
$\operatorname{div} X$	divergence of a vector field X, page 10
$\mathrm{hess}(u)$	$(1,1)$ version of $\mathrm{Hess}(u)$, page 20
Id	identity matrix, page 23
$\mathrm{Iso}(M)$	group of isometries of M, page 146
$\mathrm{Lip}_0(M)$	set of Lipschitz functions on M with compact support, page 29
ric	$(1,1)$ version of Ric, page 20
Riem	Riemann curvature tensor of type $(1,3)$, page 15
$\mathrm{Sect}(u \wedge v)$	sectional curvature of the plane π spanned by u and v, page 16
$\operatorname{supp} \varphi$	support of the function φ, page 77
Tor	torsion tensor, page 12
tr	trace, page 10
$\operatorname{vol} \partial B_R(o)$	volume of the boundary of the geodesic ball $B_R(o)$, page 28
$\operatorname{vol} B_R(o)$	volume of the geodesic ball $B_R(o)$, page 28
W	Weyl tensor, page 45
$\otimes$	tensor product, page 10
$\overline{\mathbb{B}^m}$	closed unit ball of $\mathbb{R}^m$, page 71
$\owedge$	Kulkarni-Nomizu product, page 46
$\frac{\partial \cdot}{\partial r}$	derivative in the radial direction, page 28
$\partial B_R(o)$	boundary of the geodesic ball centered at o with radius R, page 21
$(\varphi_t)_*$	push-forward of the flow, page 14
ρ	Riemannian distance from the origin of $\mathbb{B}^m$ with respect to the hyperbolic metric, page 212
Ric	Ricci tensor, page 16

$\mathrm{Ric}(\nabla r, \nabla r)$	radial Ricci curvature, page 23
$(M, \langle\ ,\ \rangle)$	Riemannian manifold with metric $\langle\ ,\ \rangle$, page 7
$\{\theta^i\}$	local orthonormal coframe, page 8
$\{e_i\}$	local orthonormal frame, page 8
$\mathrm{sgn}(\cdot)$	signum function, page 110
$\sharp$	sharp map, page 11
$\sqrt{g}$	square root of the determinant of the metric in polar geodesic coordinates, page 23
Θ^i_j	curvature forms, page 14
θ^i_j	Levi-Civita connection forms, page 8
φ_t	local flow of a vector field, page 14
$\wedge$	wedge product, page 8
$\widetilde{\langle\ ,\ \rangle}$	conformally deformed metric, page 37
A	Schouten tensor, page 45
a_+	positive part of the function a, page 89
A^f_t	t-level set of a function f, page 29
$B_R(o)$	geodesic ball centered at o with radius R, page 21
C	Cotton tensor, page 45
$C^\infty(U)$	set of smooth functions defined on the open set U, page 9
$C^{0,\alpha}(M)$	space of locally Hölder continuous functions on M with exponent α, page 165
$C^\infty_0(M)$	set of smooth function with compact support on M, page 27
c_m	constant appearing in the (geometric) Yamabe equation ($m \geq 3$), page 39
$d\omega$	exterior differential of the 1-form ω, page 12
df	exterior differential of the function f, page 11

dx^i	differential of the coordinate function x^i, page 8
exp_o	exponential map of M at o, page 21
f^*	pull-back *via* the map f, page 32
f_i	local components of the differential df, page 11
$G(x, y)$	Green kernel, page 95
H	mean curvature vector field, page 34
h^α_{ijk}	coefficients of the covariant derivative of II, page 35
h^α_{ij}	coefficients of the second fundamental tensor II, page 33
h^ν	mean curvature in the direction of ν, page 34
$K_p(\pi)$	sectional curvature of the 2-plane π, page 16
K_{rad}	radial sectional curvature, page 31
R	curvature tensor of type $(0, 4)$, page 15
r	Euclidean distance from the origin in $\mathbb{R}^m$, page 212
$r(x)$	Riemannian distance function, page 21
R^i_{jkt}	(local) components of the Riemann curvature tensor of type $(1, 3)$, page 15
$R_{ijkt,l}$	covariant derivatives of the (local) components of the curvature tensor, page 16
R_{ijkt}	(local) components of the curvature tensor of type $(0, 4)$, page 15
R_{ij}	(local) components of the Ricci tensor, page 16
S	scalar curvature, page 16
T	traceless Ricci tensor, page 18
T^*_pM	cotangent space at p, page 10
$T^s_r(M)$	set of tensor fields of type (r, s), page 10
T_pM	tangent space at p, page 10

T_{ij}	(local) components of the traceless Ricci tensor, page 18
u^*	supremum of the function u, page 102
u_*	infimum of the function u, page 148
u_{ijkt}	fourth derivatives of the function u, page 20
u_{ijk}	third derivatives of the function u, page 19
u_{ij}	(local) components of Hess(u), page 18
$W^{1,1}(M)$	Sobolev space of functions in $L^1(M)$ with (weak) gradient in $L^1(M)$, page 29
$W^{1,2}(M)$	Sobolev space of functions in $L^2(M)$ with (weak) gradient in $L^2(M)$, page 143
X^i_k	covariant derivative of the coefficient X^i, page 10

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