

Index

- * notation, 18
- δ , 19
- \sharp , 19
- Bianchi identities
 - contracted, 19
- blowing up, 69, 86
- compactness
 - of manifolds, 67
 - of Ricci flows, 69
- compatible, 71
- conjugate heat operator, 57
- connected sum, 11, 108
- convergence
 - Cheeger-Gromov, 65
 - of flows, 68
 - of pointed manifolds, 65
- convex function
 - on space of symmetric endomorphisms, 99
 - on vector bundle, 95
- curvature
 - blow-up, 52
 - derivative estimates, 39, 42
 - operator, 17
 - pinching, 88
 - preserved conditions, 38
 - positive Ricci curvature, 100
 - positive sectional curvature, 100
 - tensor, 17
- DeTurck trick, 49
- divergence, 19
- eigenvalues of $-4\Delta + R$, 63
- Einstein metrics, 2, 19
- Einstein tensor, 89
- Einstein-Hilbert action, 55
- entropy
 - \mathcal{F} , 56
 - \mathcal{W} , 71
 - classical, Boltzmann-Shannon, 61, 77
- evolution of:
 - Ric, 22, 33
 - Rm, 21, 32
 - connection, 20
 - divergence, 23
 - Einstein tensor, 89, 93
 - Laplacian, 34
 - lengths, 52
 - R, 23, 33
 - traces, 22
 - volume, 34
 - volume form, 23, 34
- \mathcal{F} functional, 56
- Fisher information, 56
- geometric manifold, 13
- geometrisation conjecture, 13
- geometry, three-dimensional, 13
- gradient flows, 55
- gravitation tensor, 19
- Gromov compactness, 67
- Hamilton, ix
- Hamilton's compactness theorem, 69
- Hamilton's theorem (three-manifolds with positive Ricci curvature), 105
- Hamilton-Ivey pinching, 107
- heat kernel, 62
- heat operator, 57

- Hessian, 16
 homogeneous, 13
- incompressible, 12
 injectivity radius, 67
 and volume, 84
 irreducible three-manifold, 12
- Jensen's inequality, 82
- Kneser, 12
- Laplacian
 connection, rough, 17
 of Rm , 31
 Lichnerowicz, 22
 Levi-Civita connection, 16
 Li-Yau Harnack inequality, 62
 log-Sobolev inequality, 72
- metric equivalence, 52
 monotonicity
 of \mathcal{F} , 60
 of \mathcal{W} , 76
 of eigenvalues, 63
 musical isomorphisms, 19
- neck pinch, 7, 8, 70
 degenerate, 9
 no local collapsing, 79
- ODE-PDE theorem, 95
- parabolic rescaling, 6
 parallel function, 93
 Perelman, ix
 Perelman's \mathcal{F} functional, 56
 Perelman's \mathcal{W} functional, 71
 Poincaré Conjecture, 15
- prime decomposition, 12
 prime three-manifold, 12
 principal symbol, 44, 46
 of Ric , 48
- Ricci curvature
 as a Laplacian of the metric, 2
 definition, 18
 traceless, Ric , 33
 Ricci flow equation, 1
 Ricci identity, 17
 roundness estimate, 102
- scalar curvature
 definition, 18
 estimates for, 36
 Seifert fibred space, 12
 Shi's curvature estimates, 42
 short time existence for Ricci flow,
 51
 solitons, 3
 Bryant, 5
 cigar, 4
 Gaussian, 5
 surgery, 15
 symmetrized gradient, 22
- tensor fields, 16
 Thurston's conjecture, 13
 total scalar curvature, 55
- Uhlenbeck trick, 90
 uniformisation, 11
 uniqueness of Ricci flows, 51
- \mathcal{W} functional, 71
 under scaling, 71
 weak maximum principle, 35
 weak minimum principle, 35