Unpublished openly accessible documents

Oliver Knill

Books and Lecture Notes

2025 Oliver Knill, Probability Theory, Math 154, Spring 2025, 66 pages

2024 Oliver Knill, Differential Geometry, Math 136, Fall 2024, 66 pages

2024 Oliver Knill, Introduction to Calculus, Math 1a, Spring 2024, 337 pages

2022 Oliver Knill, Vector calculus Math 22b, Spring 2022, 253 pages

2021 Oliver Knill, Introduction to Calculus, Math 1a, Spring 2021, 313 pages

2018-2019 Oliver Knill, Vector Calculus and Linear Algebra, Open Math Notes, AMS 404 pages,

2004-2022 Oliver Knill, Multivariable Calculus, Summer School, 109 pages

2014-2021 Oliver Knill, Single variable Calculus, Math 1a, 239 pages

2010-2022 Oliver Knill, Teaching Math with Historical Perspective, Extension School, 100 pages, 1200 slides, 50 Youtube Videos.

2011 Oliver Knill, Linear Algebra and Probability, Math 19b, 154 pages

2004 Oliver Knill, Dynamical systems, Math 118, 2005, 183 pages

2004-2017 Oliver Knill, Multivariable exams with solutions, 840 pages

2011-2014 Oliver Knill, Single variable exams with solutions, 280 pages

1997 Oliver Knill, Probability Theory, Univ. of Arizona, 82 pages

1997 Oliver Knill, Geometry and Geometric Analysis, Caltech, 121 pages

Preprint on ArXiv

2026 Oliver Knill, Remarks on connection and Dirac matrices, 16 pages

2026 Oliver Knill Block Jacobi matrices, Barycentric limits, Manifolds, 15 pages

2025 Oliver Knill, Dehn-Sommerville manifold, 28 pages

2025 Oliver Knill, Remarks on the Brouwer Conjecture, 15 pages

2025 Oliver Knill, Interacting Geodesics, 12 pages

2025 Oliver Knill, Geodesics for Discrete Manifolds, 12 pages

2025 Oliver Knill, Soft Barycentric Refinements, 13 pages

2025 Emily Kang, Oliver Knill, Density of Wave fronts, 14 pages

2024 Oliver Knill, Colorful rings of Partitions 14 pages

2024 Oliver Knill, Gauss-Bonnet for Form Curvatures, 14 pages

2024 Oliver Knill, On Symmetries of Finite Geometries, 10 pages

2024 Oliver Knill, Fusion inequality for qudratic cohomology, 12 pages

2024 Oliver Knill, Morse and Lusternik Schnirelmann for graphs, 36 pages

2024 Oliver Knill, Characteristic Topological invariants, 36 pages

2024 Oliver Knill, Manifolds from Partitions, 12 pages, 8 figures

2023 Oliver Knill, Discrete Algebraic sets in Discrete Manifolds, 13 pages, 6 figures

2023 Oliver Knill, Arboricity and Acyclic Chromatic Number, 4 pages

2023 Oliver Knill, On the Arboricity of manifolds, 12 pages

2023 Oliver Knill, The Three Tree Theorem, 17 pages, 3 figures

2023 Oliver Knill, On the cohomology of measurable sets, 7 pages

2023 Oliver Knill, Weierstrass elliptic functions for the pendulum, 7 pages, 6 figures

2023 Oliver Knill, Mandelbulb, Mandelbrot, Mandelring and Hopfbrot, 19 pages, 5 figures

2023 Oliver Knill, Cohomology of Open Sets, 26 pages, 1 figure

2023 Oliver Knill, Spectral Monotonicity of the Hodge Laplacian, 6 pages, 2 figures

2023 Oliver Knill, Characteristic Topological invariants, 19 pages

2023 Oliver Knill, The sphere formula, 20 pages

2023 Oliver Knill, Finite topologies for finite geometries, 49 pages, 3 figures

2022 Oliver Knill, On Graphs, Groups and Geometry, 51 pages, 19 figures

2022 Oliver Knill, The Babylonian Graph, 23 pages, 15 figures

2022 Oliver Knill, The Tree-Forest Ratio, 19 pages, 3 figures

2022 Oliver Knill, Eigenvalue bounds of the Kirchhoff Laplacian, 14 pages

2022 Oliver Knill, Analytic torsion for graphs, 30 pages, 17 figures

2021 Oliver Knill, The curvature of graph products, 8 pages 1 figure

2021 Oliver Knill, Coloring discrete manifolds, 10 pages

2021 Oliver Knill, Remarks about the Arithmetic of Graphs, 16 pages

2021 Oliver Knill, Graph complements of circular graphs, 47 pages, 28 figures

2020 Oliver Knill, Complexes, Graphs, Homotopy, Products and Shannon Capacity, 26 pages

2020 Oliver Knill, Green Functions of Energized complexes, 14 pages

2020 Oliver Knill, Division algebra valued energized simplicial complexes, 30 pages, 6 figures

2020 Oliver Knill, Positive Curvature and Bosons, 9 pages, 1 figure

2020 Oliver Knill, On a theorem of Grove and Searle, 12 pages, 5 figures

2020 Oliver Knill, A Dehn type quantity for Riemannian manifolds, 30 pages, 9 figures

2020 Oliver Knill, On index expectation curvature for manifolds, 13 pages

2020 Oliver Knill, Integral geometric Hopf conjectures, 20 pages, 2 figures

2019 Oliver Knill, Constant index expectation curvature for graphs or Riemannian manifolds, 17 pages, 2 figure

2019 Oliver Knill, More on Poincare-Hopf and Gauss-Bonnet, 12 pages, 11 figures

2019 Oliver Knill, Poincare Hopf for vector fields on graphs, 15 pages, 5 figures

2019 Oliver Knill, A simple sphere theorem for graphs, 18 pages 5 figures

2019 Oliver Knill, Energized simplicial complexes, 33 pages, 15 figures

2019 Oliver Knill, The counting matrix of a simplicial complex, 15 pages, 5 figures and code

2019 Oliver Knill, The energy of a simplicial complex, 34 pages

2019 Oliver Knill, A parametrized Poincare-Hopf Theorem and Clique Cardinalities of graphs

2019 Oliver Knill, More on Numbers and Graphs, 14 pages, 5 figures

2019 Oliver Knill, Dehn-Sommerville from Gauss-Bonnet

2019 Oliver Knill, The average simplex cardinality of a finite abstract simplicial complex, 19 page, 8 figures

2019 Oliver Knill, A Reeb sphere theorem in graph theory, 17 pages 4 figures

2018 Oliver Knill, Cartan's Magic Formula for Simplicial Complexes, 18 pages, 3 figures

2018 Oliver Knill, Eulerian edge refinements, geodesics, billiards and sphere coloring, 33 pages, 12 figures

2018 Oliver Knill, Some Fundamental Theorems in Mathematics,

2018 Oliver Knill, Combinatorial manifolds are Hamiltonian, 41 pages 32 figures

2018 Oliver Knill, The amazing world of simplicial complexes, AMS special session "Discretization in Geometry" in Boston on April 22, 2018

2018 Oliver Knill, The Cohomology for Wu Characteristics, 40 pages, 12 figures

2018 Oliver Knill, The hydrogen identity for Laplacians, 29 pages, 8 figures

2018 Oliver Knill, Listening to the cohomology of graphs, 20 pages, 1 figure

2018 Oliver Knill, An Elementary Dyadic Riemann Hypothesis, 37 pages, 12 figures

2017 Oliver Knill, One can hear the Euler characteristic of a simplicial complex, 9 pages, 2 figures

2017 Oliver Knill, On Atiyah-Singer and Atiyah-Bott for finite abstract simplicial complexes, 12 pages

2017 Oliver Knill, The strong ring of simplicial complexes, 40 pages, 8 figures

2017 Oliver Knill, On the arithmetic of graphs, 43 pages, 27 figures

2017 Oliver Knill, On a Dehn-Sommerville functional for simplicial complexes, 24 pages, 10 figures

2017 Oliver Knill, On Helmholtz free energy for finite abstract simplicial complexes, 23 pages, 5 figures

2017 Oliver Knill, Sphere geometry and invariants, 39 pages, 10 figures

2016 Oliver Knill, On Fredholm determinants in topology, 41 pages, 20 figures

2016 Oliver Knill, On Particles and Primes, 39 pages, 14 figures.

2016 Oliver Knill, On Primes, Graphs and Cohomology, 26 pages, 5 figures

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2016 Oliver Knill, Gauss-Bonnet for multi-linear valuations, 71 pages, 14 figures

2015 Oliver Knill, Universality for Barycentric subdivision, 17 pages, 2 figures

2015 Oliver Knill, A Sard theorem for graph theory, 30 pages, 8 figures

2015 Oliver Knill, The graph spectrum of barycentric refinements, 20 pages 12 figures

2015 Oliver Knill, The Jordan-Brouwer theorem for graphs, 26 pages, 1 figure

2015 Oliver Knill, The Kuenneth formula for graphs, 60 pages 56 figures

2015 Oliver Knill, Graphs with Eulerian unit spheres, 44 pages, 17 figures

2014 Oliver Knill, Coloring graphs using topology, 81 pages, 48 figures

2014 Oliver Knill, Characteristic Length and Clustering, 20 pages 13 figures

2014 Oliver Knill, Curvature from Graph Colorings, 14 pages, 6 figures

2014 Oliver Knill, If Archimedes would have known functions, 31 pages, 36 figures

2014 Oliver Knill, Classical mathematical structures within topological graph theory, 28 pages

2014 Oliver Knill, A notion of graph homeomorphism, 11 figures, 33 pages

2013 Oliver Knill, The zeta function for circular graphs, 24 pages and 7 figures

2013 Oliver Knill, On quadratic orbital networks, 13 figures 15 pages

2013 Oliver Knill, Natural orbital networks, 20 pages, 36 figures

2013 Oliver Knill, Dynamically generated Networks, 28 pages, 53 figures

2013 Oliver Knill, Counting rooted forests in a network, 13 pages, 6 figures

2013 Oliver Knill, The Euler characteristic of an even-dimensional graph, pages, 4 figures

2013 Oliver Knill, Elizabeth Slavkovsky, Illustrating Mathematics using 3D Printers, Oliver Knill, 95 figures,

2013 Oliver Knill, Isospectral deformations of the Dirac operator, 32 pages, 8 figures

2013 Oliver Knill, The Dirac operator of a graph, 2 figures, 21 pages. Talk given on June 5, 2013 at the Providence meeting of ILAS

2013 Oliver Knill, Cauchy-Binet for Pseudo-Determinants, 30 pages,

2013 Oliver Knill, An integrable evolution equation in geometry, 8 pages, 2 figures

2013 Oliver Knill Elizabeth Slavkovsky, Thinking like Archimedes with a 3D printer, 16 pages, 13 figures

2013 Oliver Knill, The McKean-Singer Formula in Graph Theory, 36 pages, 25 figures

2012 Oliver Knill, The Lusternik-Schnirelmann theorem for graphs, Frank Josellis, 29 pages, 7 figures.

2012 Oliver Knill, Selfsimilarity in the Birkhoff sum of the cotangent function, 21 pages, 9 figures

2012 Oliver Knill, A Multivariable Chinese Remainder Theorem, 16 pages, 1 figure,

2012 Oliver Knill, A Brouwer fixed point theorem for graph endomorphisms, 24 pages, 6 figures,

2012 Oliver Knill, An index formula for simple graphs, 24 pages, 6 figures,

2012 Oliver Knill, On index expectation and curvature for networks,

2012 Oliver Knill, The theorems of Green-Stokes,Gauss-Bonnet and Poincare-Hopf in Graph Theory, 10 pages, 30 figures,

2012 Oliver Knill, A graph theoretical Poincare-Hopf Theorem, 9 figures

2011 Oliver Knill, On the Dimension and Euler characteristic of random graphs, 18 pages, 14 figures, 4 tables

2011 Oliver Knill, A graph theoretical Gauss-Bonnet-Chern Theorem, 26 pages, 70 figures

2010 Oliver Knill, A discrete Gauss-Bonnet type theorem, 27 pages, 56 figures

2010 Oliver Knill Folkert Tangerman, Selfsimilarity and growth in Birkhoff sums for the golden rotation,14 pages, 8 figures

2008 Oliver Knill John Lesieutre, Analytic continuation of Dirichlet series with almost periodic coefficients, 15 pages

2007 Oliver Knill, The oldest problem in mathematics, 26 pages booklet

2007 Oliver Knill Jose-Ramirez-Herran, Space and camera path reconstruction for omni-directional vision, 23 pages

2007 Oliver Knill Jose-Ramirez-Herran, On Ullman's theorem in computer vision, 16 pages, 13 figures

2007 Oliver Knill Jose-Ramirez-Herran, A structure from motion inequality, 15 pages, 22 figures

2004 Oliver Knill, Fluctuation Bounds for Subharmonic Functions, 15 pages
$https : //www.researchgate.net/publication/2333478\_Fluctuation\_Bounds\_for\_Subharmonic\_Functions.$

2000 Oliver Knill, On Hausdorff's Moment Problem in Higher dimensions, 8 pages, $www.math.harvard.edu/~knill/preprin$

2000 Oliver Knill, On the cohomology of discrete Abelian Group actions.17 pages $http : //www.ma.utexas.edu/mp\_arc/c/$
$58.ps.gz$