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Introduction to Moduli spaces of flat connections

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There are many references for this topic as it appears in several different fields of mathematics. Here are just a few of them that are related to or will be used in this lecture series.

Motivation

1. M. Atiyah, *The Geometry and Physics of Knots*

Background on geometry and Lie groups

1. L. Duistermaat, *Lie Groups (Chapter 1.1-1.4: Lie groups and Lie algebras; Chapter 2.1-2.4: group actions and associated bundles)*
2. J. Milnor, *Characteristic Classes (Chapter 1-3: manifolds and vector bundles)*
3. M. Audin, *The Topology of Torus Actions on Symplectic Manifolds.*
4. L. Jeffrey, *Hamiltonian Group Actions and Symplectic Reduction*, IAS/Park City Mathematics Series.
5. E. Meinrenken, *Lecture Notes on Symplectic Geometry.*
6. A. Cannas da Silva, *Lectures on Symplectic Geometry.*

Yang-Mills theory

1. V. Guillemin and S. Sternberg, *Symplectic Techniques in Physics (Chapter 3)*
2. J. Jost, *Riemannian Geometry and Geometric Analysis (Chapter 3, 4.1-4.2)*
3. S. Donaldson, *The Geometry of Four-Manifolds, (Chapter 2, 4, 6)*

Principal bundles, holonomy, and surface group representations

1. S. Kobayashi, *Foundations of Differential Geometry I (Chapter 2)*
2. C. Taubes, *Differential Geometry: Bundles, Connections, Metrics and Curvature*
3. A. Alekseev, A. Malkin, and E. Meinrenken, *Lie group valued moment maps*

4. W. Goldman, *The symplectic nature of fundamental groups of surfaces*
5. W. Goldman and J. Millson, *The deformation theory of representations of fundamental groups of compact Kaehler manifolds, IHES 1988 (Sections 4, 5)*

Vector bundles and their moduli spaces

1. S. Kobayashi, *Differential Geometry of Complex Vector Bundles*
2. R. Gunning, *Lectures on Vector Bundles over Riemann Surfaces*
3. S. Mukai, *An Introduction to Invariants and Moduli*
4. O. Garcia-Prada, *Moduli spaces and geometric structures (appendix in third edition of R. Wells, Differential Analysis on Complex Manifolds)*

Complex geometry

1. R. Wells, *Differential Analysis on Complex manifolds (third edition)*
2. D. Huybrechts, *Complex Geometry*

Fundamental papers

1. M. Atiyah and R. Bott, *The Yang-Mills equations over Riemann surfaces*
2. N. Hitchin, *The self-duality equations on a Riemann surface*
3. M. Atiyah, *Collected Works, Volume 5 - Gauge theories*