

Seminar: Kähler manifolds

Winter term 2017/18

Prof. Bernd Ammann

Monday 16-18

Special dates:

- 23.10. Gauß lecture
- 11.12. GK meeting in Windberg

1 Complex manifolds and complex geometry

This part is the center of the seminar. Here the participants should learn the basic definitions, constructions and results for complex manifolds

Talk no. 1: Complex and holomorphic structures. *16.10.* JULIAN SEIPEL.
[2, Chap. 7 and 8].

Talk no. 2: Vector bundles with complex, holomorphic and hermitian structures. *30.10.* JONATHAN GLÖCKLE.
[2, Chap. 9 and 10]

Talk no. 3: Hermitian and Kähler metrics. *6.11.* NOBUHIKO OTOBA.
[2, Chap. 11 and Chap. 12]

Talk no. 4: Curvature of Kähler metrics and examples. *13.11.* BERND AMMANN.
[2, Chap. 13]

Talk no. 5: Laplace operators, Hodge and Dolbeault theories. *20.11.* ROMAN SCHIESSL.
[2, Chap. 14 and 15]

Supplementary Talk no. 1: Characteristic classes *27.11.* N.N..
Will be fixed later, e.g. following [2, Chap. 16]

Talk no. 6: The Hirzebruch-Riemann-Roch formula. *4.12.* N.N..
In this talk we discuss the Hirzebruch-Riemann-Roch formula as a special case of the Atiyah-Singer index theorem. The talk will probably fill two sessions. The talk should be given by someone who is already familiar with the Atiyah-Singer index theorem, to combine this with Moroianu's book. See [2, Chap. 21]

2 Advanced topics

We now shall discuss some more advanced topics. If we start the seminar with the introduction to Riemannian geometry, we will not have time for this part,

then the seminar will end at this point and we may discuss to continue the seminar in the summer term.

The exact program will be fixed later. Possible topics are

- Applications of the Hirzebruch-Riemann-Roch formula
- Kodaira embedding theorem
- The Calabi-Yau theorem

Seminar-Homepage

<http://www.mathematik.uni-regensburg.de/ammann/kaehler>

Literatur

- [1] BALLMANN, W. Lectures on Kähler manifolds. ESI Lectures in Mathematics and Physics. European Mathematical Society (EMS), Zürich, 2006.
- [2] MOROIANU, A. Lectures on Kähler geometry, vol. 69 of London Mathematical Society Student Texts. Cambridge University Press, Cambridge, 2007.