

Seminar on Modular Forms

Winter Semester 2006

Organisation:

Prof. Dr. Özlem Imamoglu (ozlem.imamoglu@math.ethz.ch)

Prof. Dr. Richard Pink (richard.pink@math.ethz.ch)

Dirk Zeindler (dirkz@math.ethz.ch)

Time and Location: HG G 19.2 from 15:15–17:00

Calender

08.11	Group 1
15.11	Group 1
22.11	Group 2
29.11	Group 2
06.12	Group 3
13.12	Group 3
20.12	open Date
27.12	No Seminar
03.01	No Seminar
10.01	Group 4
17.01	Group 4
24.01	Group 5
31.01	Group 5

Group 1.

Speakers: Berta Mario Andrea, Bonaccorso Salvatore, Fuchs Urs

Topics: The modular group, different realizations of the upper half plane, fundamental domain, reduction of quadratic forms and the modular group.

Basic definitions and properties of modular forms, lattice functions, elliptic functions, Eisenstein series and their Fourier expansion.

References: [1] p. 26–34, [3] p. 1–8, [5] p. 98–107, [7] p.77–84, [8] p.1–27, [9] p. 121–127

Group 2.

Speakers: Jermann Jonas Christian, Schweizer Sacha Edmond, Dirk Zeindler

Topics: Dimension of modular forms, the j -function, mapping properties of the j -function, Picard's little theorem, Dedekind eta function, congruence properties of coefficients of j . *References:* [1] p. 34–51, 74–91, [5] p. 108–122, [7] p. 95–97

Group 3.

Speakers: Rubin Felix Pascal, Schieder Simon Fabian, Steiger Andreas

Topics: Dirichlet series, zeta and L -functions, the Riemann zeta function, Riemann's first and second proof of its analytic continuation, density and Dirichlet's theorem.

References: [2] p. 224–265, [5] p. 70–75, [7] p. 61–76,

Group 4.

Speakers: Maier Alex Georg, Peter Andrea Angelica, Rsch Christoph

Topics: Mellin transform, growth of Fourier coefficients of modular forms, L -function of modular forms, Hecke's converse theorem.

Hecke operators, their action on modular forms, eigen functions, Euler products.

References: [3] p. 57–70, 85–102 [5] p. 139–141, 153–174, [6] p. 114–129, [7] p. 98–106,

Group 5.

Speakers: Hempel Maria, Leis Jrg, Lewark Lukas Pascal

Topics: Poincare series, Petersson inner product, completeness.

Theta functions, quadratic forms, sums of squares.

References: [3] p. 62–70, 85–102, [4] p. 63–88, [7] p. 108–111,

Dates: January 24th and 31st

REFERENCES

- [1] T. M. Apostol, *Modular Functions and Dirichlet series in Number theory*, GTM 41, Springer-Verlag
- [2] T. M. Apostol, *Introduction to analytic number theory*, Springer-Verlag
- [3] R.C. Gunning, *Lectures on Modular Forms*, Princeton University Press
- [4] M. Knopp, *Modular Functions*, Chelsea Publishing
- [5] N. Koblitz, *Introduction to Elliptic Curves and Modular Forms*, GTM 97, Springer-Verlag
- [6] T. Miyake, *Modular Forms*, Springer-Verlag
- [7] J.-P. Serre, *A course in arithmetic*, GTM 7, Springer-Verlag
- [8] G. Shimura, *Introduction to the Arithmetic Theory of Automorphic forms*, Princeton University Press
- [9] A. Terras, *Harmonic analysis on symmetric spaces and applications I*, Springer-Verlag