Modular forms and their combinatorial variants

Topics in Mathematical Science IV, Nagoya University, Spring 2023

Homepage for this course: `https://www.henrikbachmann.com/mf_2023.html`.

- **Contact**
  Name: Henrik Bachmann, Room: 457 (Math. Building).
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- **Lecture notes:**
  I will provide lectures notes for the lectures which will be updated during the next weeks. You will find a preliminary version on the homepage in the coming days. Please check the homepage regularly for updates. If you find any typos in the notes please let me know.
- **Lectures**
  We we will have 15 lectures: 04/14, 04/21, 04/28, 05/12, 05/19, 05/26, 06/02, 06/09 (On this day is medai-sai. Not decided yet if we do lecture this day), 06/16, 06/23, 06/30, 07/07, 07/14, 07/21, 07/28.
  (we will not use the make-up days on 05/13 and 06/06)
- **Grading & Exercises:**
  The grading will be based on written homework assignments. The first homework sheet will appear in TACT in the second week. Be sure to be member of `https://tact.ac.thers.ac.jp/portal/site/n_2023_3211090` and be aware of TACT announcements.
- **Literature:**
  There are various books on modular forms and lecture notes, which can be found in the library and online. Below you can find a list of standard books, which we will use during the lectures. We will need some tools from complex analysis, which can be found in [FB] or [SS].

References

[CS] H. Cohen, F. Strömberg: *Modular Forms: A Classical Approach*, Graduate Studies in Mathematics, Volume: 179, American Mathematical Society, 2017.

[DS] F. Diamond, J. Shurman: *A first course in modular forms*, Graduate Texts in Mathematics, No. 228. Springer-Verlag, New York, 2005.

[FB] E. Freitag, R. Busam: *Complex analysis*, Second edition, Universitext, Springer-Verlag, Berlin, 2009.

[Ki] L. J. P. Kilford: *Modular forms. A classical and computational introduction*, Imperial College Press, London, 2008.

[Ko] N. Koblitz: *Introduction to elliptic curves and modular forms*, Graduate Texts in Mathematics, No. 97. Springer-Verlag, New York, 1993.

[L] S. Lang: *Introduction to modular forms*, Grundlehren der mathematischen Wissenschaften, No. 222. Springer-Verlag, Berlin-New York, 1976.

[S] J.-P. Serre: *A course in arithmetic*, Graduate Texts in Mathematics, No. 7. Springer-Verlag, New York-Heidelberg, 1973. (Chapter VII)

[SS] E. Stein, R. Shakarchi: *Complex analysis*, Princeton Lectures in Analysis, 2. Princeton University Press, Princeton, NJ, 2003

[Z] D. Zagier: *Elliptic modular forms and their applications*, first part in "The 1-2-3 of modular forms", Universitext. Springer-Verlag, Berlin, 2008. (available at `http://people.mpim-bonn.mpg.de/zagier/files/doi/10.1007/978-3-540-74119-0_1/fulltext.pdf`)