Freie Universität Berlin

(Pro-)Seminar zur Diskreten Mathematik
Sommersemester 2021

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Themen

Vorträge können sowohl auf Deutsch als auch auf Englisch gehalten werden. Für den Teilnahmeschein erwarten wir:

- einen ca. 60 minütigen Vortrag mit anschließender Diskussion und Fragen,
- einen Probevortrag eine Woche vor dem eigentlichen Vortrag,
- aktive Teilnahmen an den Seminarsitzungen.

Wir bitten alle Teilnehmenden, wenn möglich ihre Kameras einzuschalten.

Talks can be given in English and German. In order to get the "Teilnahmeschein" we expect:

- a talk for about 60 minutes followed by discussion and Q&A,
- a practice talk one week before your actual talk,
- active participation during seminar sessions.

We encourage everybody to switch on their cameras if at all possible.

(13.04.2021) **Themenvergabe**

(20.04.2021) **How to give a good talk? How to give valuable feedback?** (Sophie)
Literatur:

Giving Good talks, Satyan L. Devadoss, Notices of the American Mathematical Society 66 (2019).
Giving a Talk, Bryna Kra, Notices of the American Mathematical Society 60 (2013).
Advice on Giving a Good Power Point Presentation, Joseph A. Gallian, Math Horizons (April 2006).
A Reflection on Giving Talks, Andrés R. Vindas Meléndez, AMS Blogs.
A Reflection on Giving ONLINE Talks, Laura Colmenarejo and Andrés R. Vindas Meléndez, AMS Blogs

(27.04.2021) **Pause/Probevorträge**

(04.05.2021) **Thema 1: Some history: How the ASM-conjecture was solved** (Sven)
Literatur:

How the Alternating Sign Matrix Conjecture Was Solved, David Bressoud and James Propp, Notices of the American Mathematical Society (July 1999).
Proofs and Confirmations: The Story of the Alternating-Sign Matrix Conjecture, David M. Bressoud, Cambridge: Cambridge University Press (1999).

(11.05.2021) **Thema 2: The many faces of alternating sign matrices** (Dana)
Literatur:

The Many Faces of Alternating-Sign Matrices, James Propp, Discrete Models: Combinatorics, Computation, and Geometry, DM-CCG 2001, 2001, Paris, France. pp.43-58.
The mysterious story of square ice, piles of cubes, and bijections, Ilse Fischer and Matjaz Konvalinka, PNAS 117, 23460–23466 (2020).

(18.05.2021) **Pause/Probevorträge**

(25.05.2021) **Thema 3: The poset perspective on alternating sign matrices** (Manuel)

Literatur:

The poset perspective on alternating sign matrices Jessica Striker, Discrete Math. Theor. Comput. Sci. Proc. (2009), 813–824.

(01.06.2021) **Thema 4: Plane Partitions & MacMahon's Omega Operator** (Urs)

Literatur:

MacMahon's Dream, George E. Andrews and Peter Paule, In: *Partitions, q-series, and modular forms*, 1–12, Dev. Math., 23, Springer, New York, 2012.

MacMahon's partition analysis. XII. Plane partitions, George E. Andrews and Peter Paule, J. Lond. Math. Soc. (2) 76 (2007), 647–666

(08.06.2021) **Pause/Probevorträge**

(15.06.2021) **Thema 5: Partition Identities & Polyhedral Geometry**

Literatur:

Mahonian Partition Identities Via Polyhedral Geometry, Matthias Beck, Benjamin Braun, and Nguyen Le, in: *From Fourier analysis and number theory to Radon transforms and geometry*, 41–54, Dev. Math. 28, Springer, New York, 2013.

(22.06.2021) **Thema 6: The Birkhoff-von Neumann-polytope** (Raul)

Literatur:

On the Volume of the Polytope of Doubly Stochastic Matrices. Clara S. Chan and David P. Robbins, Experiment. Math. 8 (1999), 291–300.

Chapter 6: Magic Squares in *Computing the Continuous Discretely*, Matthias Beck and Sinai Robins, Springer (2015).

(29.06.2021) **Pause/Probevorträge**

(07.07.2021) **Thema 7: The alternating sing matrices polytope**

Literatur:

The alternating sing matrices polytope. Jessica Striker, Electron. J. Combin. 16 (2009), Research Paper 41.

(14.07.2021) **Thema 8: ?**

Literatur:

Possible side tracks: Generalizations such as *Sign-restricted matrices of* 0*'s,* 1*'s, and* -1*'s* by Richard A. Brualdi and Geir Dahl (2021), or computational geometry gone integer partitions (*Polyhedral Omega: a new algorithm for solving linear Diophantine systems*, Felix Breuer, Zafeirakis Zafeirakopoulos, Ann. Comb. 21 (2017), 211–280).