

Institut f. Analysis und Zahlentheorie

Zahlentheoretisches Kolloquium

Freitag, 10.3.2017, 14:00 Uhr

SR Analysis-Zahlentheorie (NT02008), Kopernikusgasse 24, 2.Stock

Markov chains, generalized continued fractions, and Pringsheim-type convergence criteria

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In many applications, invariant measures for Markov chains have to be calculated. Most often, this has to be done in an algorithmic way. For Markov chains with a special transition structure (quasi-birth-death processes), efficient algorithms can be written in terms of matrix-valued continued fractions.

In the first part of this talk, we will discuss details concerning this relationship, and in particular, we will see that the convergence of the continued fractions which occur in the context of Markov chains is strongly connected to Pringsheim-type convergence criteria for continued fractions.

In the Markov chain context, the continued fractions and its approximants have a probabilistic interpretation. In the second part of the talk, we will consider Markov chains with more general transition structures. Based on the probabilistic interpretation, we will propose a definition for generalized continued fractions. Although the primary intention of this construction is the algorithmic treatment of generally structured Markov chains, it turns out that this definition enables us to

- define \mathcal{R} -valued generalized continued fractions where \mathcal{R} is an arbitrary Banach algebra,
- identify a huge variety of generalizations of continued fractions found in the literature as special cases,
- prove Pringsheim-type criteria in the same way as for non-generalized continued fractions.

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