TECHNISCHE UNIVERSITÄT
ILMENAU
FAKULTÄT FÜR INFORMATIK UND AUTOMATISIERUNG
INSTITUT FÜR THEORETISCHE INFORMATIK

INSTITUTSSEMINAR

Am Donnerstag, dem **23. März 2023**, spricht um **11:00 Uhr** im Raum **OEC 3007**

Herr Harry Vinall-Smeeth

zum Thema:

Multi-Structural Games: a Survey and Possible Extensions

Abstract:

In this talk, we will examine a new tool for proving inexpressibility results for first-order logic introduced by Fagin, Lenchner, Regan and Vyas [1], so-called multi-structural (MS) games. While the classical tool for this task, Ehrenfeucht-Fraisse games, captures the quantifier depth of a sentence needed to separate two structures, MS games capture the number of quantifiers needed to separate two classes of structures.
Such games are therefore easier for Duplicator to win and so, in principle, provide a powerful technique for proving inexpressibility results. This talk will discuss the results obtained by using these games in [1] and [2], before moving on to discuss ongoing work which extends these games to the k-variable fragment of FO. As a first application, we can tackle the following question: given two n-element structures A and B, that can be distinguished by the k-variable fragment of first-order logic what is the minimum f(n,k) such that there is guaranteed to be a sentence φ with at most f(n,k) quantifiers, such that $A \models \varphi$ but $B \not\models \varphi$.

[1] Ronald Fagin, Jonathan Lenchner, Kenneth W. Regan, Nikhil Vyas:
Multi-Structural Games and Number of Quantifiers. LICS 2021: 1-13

[2] Ronald Fagin, Jonathan Lenchner, Nikhil Vyas, Ryan Williams: On the Number of Quantifiers as a Complexity Measure. MFCS 2022: 48:1-48:14

Alle Interessenten sind herzlich eingeladen.

Ilmenau, 09.03.2023 Univ.-Prof. Dr. Christoph Berkholz