EINLADUNG

An der Fakultät für Informatik wird

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LS 11

einen Vortrag halten über

Designing q-Unique DNA Sequences with Integer Linear Programs and Euler Tours in De Bruijn Graphs

ORT: OH16-205
ZEIT: Mittwoch, 20. Juni 2012, 16:15 Uhr

ZUSAMMENFASSUNG:

DNA nanoarchitectures require carefully designed oligonucleotides with certain non-hybridization guarantees, which can be formalized as the q-uniqueness property on the sequence level. We study the optimization problem of finding a longest q-unique DNA sequence. We first present a convenient formulation as an integer linear program on the underlying De Bruijn graph that allows to flexibly incorporate a variety of constraints; solution times for practically relevant values of q are short. We then provide additional insights into the problem structure using the quotient graph of the De Bruijn graph with respect to the equivalence relation of reverse complementarity. Specifically, for odd q the quotient graph is Eulerian, and finding a longest q-unique sequence is equivalent to finding an Euler tour, hence solved in linear time (with respect to the output string length). For even q, self-complementary edges complicate the problem, and the graph has to be Eulerized by deleting a minimum number of edges. Two sub-cases arise, for one of which we present a complete solution, while the other one remains open.

ZU DIESEN VORTRÄGEN LADEN HERZLICH EIN
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