

A Strong Direct Product Theorem for Disjointness

Dr Hartmut Klauck

Centre for Quantum Technologies
National University of Singapore



Date : 3 September 2009 (Thursday)
Time : 10.30 am – 11.30 am
Venue: SPMS-Executive Classroom 1, MAS-03-06
School of Physical and Mathematical
Sciences

A strong direct product theorem says that if we want to compute k independent instances of a function, using less than k times the resources needed for one instance, then the overall success probability will be exponentially small in k . We establish such a theorem for the randomized communication complexity of the Disjointness problem. This main result also implies a new lower bound for Disjointness in restricted 3-player protocols, and optimal communication-space tradeoffs for Boolean matrix product. Our main result uses a new lower bound method in communication complexity based on linear programming duality, and employs a so-called Intersection Sampling Lemma that generalizes a result by Razborov.

Speaker Biography

Hartmut Klauck received a Diplom (Master's degree) in computer science from the University of Paderborn in 1995, and a PhD in computer Science from Johann Wolfgang Goethe-Universität in 2000 (Advisor: Georg Schnitger). He was then a postdoctoral fellow at CWI (Amsterdam), spent the year 2002-2003 at the Institute for Advanced Study in Princeton, and another year as postdoc at the University of Calgary. From 2004-2008, he led a "Junior Research Group" at the University of Frankfurt before joining Singapore's Centre for Quantum Technologies this year. His research interests include complexity theory, in particular communication complexity, and quantum computation.

Host: Prof. Bernhard Schmidt, Division of Mathematical Sciences, School of Physical and Mathematical Sciences

Queries to: Ms Denise Lim, deniselimrj@ntu.edu.sg, Tel: 6513 7428

SCHOOL OF PHYSICAL AND MATHEMATICAL SCIENCES

NANYANG TECHNOLOGICAL UNIVERSITY
SPMS-MAS-03-01, 21 NANYANG LINK, SINGAPORE 637371
FAX: +65 6515 8213 TEL: +65 6513 7423