

# Theoretical Computer Science

## Nada, KTH

### Scientific Output 1989-1992

*Stefan Arnborg, Johan Håstad*

#### **Information activities — Articles prepared for Swedish computer newspapers and popular science magazines**

Hollman, J., Reviews of *Mathematica*, *Maple*, *Reduce*, *Matlab*, etc., Industriell Datateknik, 1989–1992.

Kann, V., Reviews of *Derive*, *Maple*, *MathCAD*, *Minsq*, etc., Industriell Datateknik, 1989–1992.

#### **Licentiate degree and Ph. D. theses**

Abdulla, P., *Decision problem in systolic circuit verification*, Ph. D. thesis, Uppsala (1990).

Feng, H., *Decomposition and computation of the topology of plane real algebraic curves*, Ph. D. thesis, Nada report TRITA-NA-9214 (1992).

Goldmann, M., *On threshold circuits and related models of computation*, Ph. D. thesis, Nada report TRITA-NA-9215 (1992).

Hollman, J., *Theory and applications of Gröbner bases*, Ph. D. thesis, Nada report TRITA-NA-9212 (1992).

Kann, V., *On the approximability of NP-complete optimization problems*, Ph. D. thesis, Nada report TRITA-NA-9206 (1992).

Lagergren, J., *Algorithms and minimal forbidden minors for tree-decomposable graphs*, Ph. D. thesis, Nada report TRITA-NA-9104 (1991).

Langemyr, L., *Computing the GCD of two polynomials with algebraic coefficients*, Ph. D. thesis, Nada report TRITA-NA-8804 (1989).

#### **Masters theses**

Berg, Christer, *A search for minimal forbidden minors*, Nada report TRITA-NA-E9288 (1992).

Johansson, L., Németh, P., *Några experiment i beräkningsbar algebra med användande av Gröbnerbaser (Some experiments in computable algebra using Gröbner bases)*, in Swedish, Department of Mathematics, KTH (1991).

## Journal publications

- Abdulla, P., *Automatic verification of a class of systolic circuits*, Formal aspects of computing **4** (1992), 149–194.
- Aiello, W., Goldwasser, S., Håstad, J., *On the power of interaction*, Combinatorica **10** (1990), 3–25.
- Aiello, W., Håstad, J., *Statistical zero-knowledge languages can be recognized in two rounds*, J. Comput. System Sci. **42** (1991), 327–345.
- Aiello, W., Håstad, J., *Relativized perfect zero-knowledge is not BPP*, Inform. and Comput. **93:2** (1991), 223–240.
- Alon, N., Goldreich, O., Håstad, J., Peralta, R., *Simple constructions of almost  $k$ -wise independent random variables*, Random Structures and Algorithms **3:3** (1992), 289–304.
- Arnborg, S., Lagergren, J., Seese, D., *Problems easy for tree-decomposable graphs*, J. Algorithms **12** (1991), 308–340.
- Arnborg, S., Proskurowski, A., *Canonical representations of partial 2- and 3-trees*, BIT **32** (1992), 197–214.
- Arnborg, S., Proskurowski, A., *Linear time Algorithms for NP-hard Problems on Graphs Embedded in  $k$ -trees*, Discr. Appl. Math., **23** (1989), 11–24.
- Arnborg, S., Proskurowski, A., Corneil, D., *Forbidden minors characterization of partial 3-trees*, Discr. Math. **80** (1990), 1–19.
- Beame, P., Håstad, J., *Optimal bounds for decision problems on the CRCW PRAMs*, J. ACM **36** (1989), 643–670.
- Goldmann, M., Håstad, J., *A simple lower bound for monotone clique using a communication game*, Inform. Process. Lett. **41:4** (1992), 221–227.
- Goldmann, M., Håstad, J., Razborov, A., *Majority gates vs. general weighted threshold gates*, Comput. Complexity **1:4** (1992), 277–300.
- Grape, P., *Complete problems with  $L$ -samplable distributions*, BIT **31** (1991), 394–405.
- Håstad, J., *Tensor rank is NP-complete*, J. Algorithms **11** (1990), 644–654.
- Håstad, J., *Almost optimal lower bounds for small depth circuits, randomness and computation*, Advances in Computing Research **5**, ed. S. Micali, (1989), 143–170.
- Håstad, J., Goldmann, M., *On the power of small-depth threshold circuits*, Comput. Complexity **1** (1991), 113–129.
- Håstad, J., Just, B., Lagarias, J., Schnorr, C., *Polynomial time algorithms for finding integer relations among real numbers*, SIAM J. Computing **18:5** (1989), 859–881.
- Håstad, J., Lagarias, J., *Simultaneously good bases of a lattice and its reciprocal lattice*, Mathematische Annalen **287** (1990), 163–174.
- Kann, V., *Maximal 3-dimensional matching is MAX SNP complete*, Inform. Process. Lett. **37:1** (1991), 27–35.
- Langemyr, L., McCallum, S., *The computation of polynomial greatest common divisors over an algebraic number field*, J. Symbolic Computation, **8** (1989), 429–448.

- Langemyr, L., *Circuits for computing the GCD of two polynomials over an algebraic number field*, Inform. Process. Lett. **38** (1991), 129–134.
- Langemyr, L., *Algorithms for a multiple algebraic extension*, Progr. Math. **94** (1991), 235–248.

### **Selected conference presentations**

- Abdulla, P., *A method for automatic verification of a class of systolic circuits*, The IFIP International Workshop on Applied Formal Methods for Correct VLSI Design, 1989.
- Arnborg, S., Courcelle, B., Proskurowski, A., Seese, D., *An algebraic theory of graph reduction*, Graph Grammars Conference, Bremen 1990.
- Arnborg, S., Hollman, J., *Computing Gröbner bases over a rational function field*, 4th IMA Conf. on Mathematics of surfaces, Bath 1990.
- Arnborg, S., Proskurowski, A., *Canonical representations of partial 2- and 3-trees*, SWAT 1990.
- Backelin, J., Hollman, J., *Calculating Gröbner bases fast*, Disco 1992.
- Fröberg, R., Hollman, J., *Some comments on a paper by Moreno*, Computational Algebraic Geometry and Communicative Algebra 1991.
- Goldmann, M., Håstad, J., Razborov, A., *Majority gates vs. general weighted threshold gates*, STRUCTURE 1992, 2–13.
- Grape, P., *Complete problems with L-samplable distributions*, SWAT 1990.
- Hollman, J., *On the computation of the Hilbert series*, Latin 1992, São Paulo, LNCS 583.
- Hollman, J., Langemyr, L., *Algorithms for non-linear algebraic constraints*, WCLP 1991.
- Håstad, J., *Pseudorandom generators under uniform assumptions*, STOC 1990.
- Håstad, J., Goldmann, M., *On the power of small-depth threshold circuits*, FOCS 1990, 610–618.
- Håstad, J., Leighton, T., Newman, M., *Fast computation using faulty hypercubes*, STOC 1989, 251–263.
- Håstad, J., Schrift, A., Shamir, A., *The discrete logarithm modulo a composite hides  $O(n)$  bits*, STOC 1990.
- Kann, V., *On the approximability of the maximum common subgraph problem*, STACS 1992, LNCS 577, 377–388.
- Karchmer, M., Newman, I., Saks, M., Wigderson, A., *Non-deterministic communication complexity with few witnesses*, Seventh Annual conference on structure in complexity theory 1992, 275–281.
- Lagergren, J., *Efficient parallel algorithms for tree-decomposition and related problems*, FOCS 1990.
- Lagergren, J., *A finite congruence for tree-width at most  $k$* , Tree-structured graphs, forbidden configurations and graph algorithms, Bordeaux 1991.
- Lagergren, J., *Finite congruences and obstructions*, The graph minor conference, Seattle 1991.

- Lagergren, J., Arnborg, S., *Finding minimal forbidden minors using a finite congruence*, ICALP 1991, 532–543.
- Langemyr, L., *Cylindrical algebraic decomposition and multiple algebraic extensions*, Proc. 4th IMA Conference on the Mathematics of Surfaces, 1990.
- Langemyr, L., *An asymptotically fast probabilistic algorithm for computing polynomial GCD's over an algebraic number field*, AAECC 1991, LNCS 508, 222–233.
- Langemyr, L., *An analysis of the subresultant algorithm over an algebraic number field*, ISSAC 1991, 167–172.
- Langemyr, L., *Algorithms for a multiple algebraic extension II*, AAECC 1991, LNCS 539, 224–233.

### **Technical reports**

- Hollman, J., Kann, V., *En metod för svensk rättstavning baserad på bloomfilter (A method for Swedish spelling based on Bloom filters)*, in Swedish, Nada report TRITA-NA-P9213 (1992).
- Kann, V., *An algorithm solving the Euclidean travelling salesperson problem*, Nada report TRITA-NA-9102 (1991).