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FLUIDFIT

# Zoli 50 !

# Combinatorial Optimization Day: Orientations, Matchings and Rigidity

# Zoli will be 50 in a week !

## Combinatorial Optimization Day: Orientations, Matchings and Rigidity

1. Orientations and Connectivity
2. Matchings, T-joins, Conservative weightings

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# Zoli and his work

**Scheduled part** :

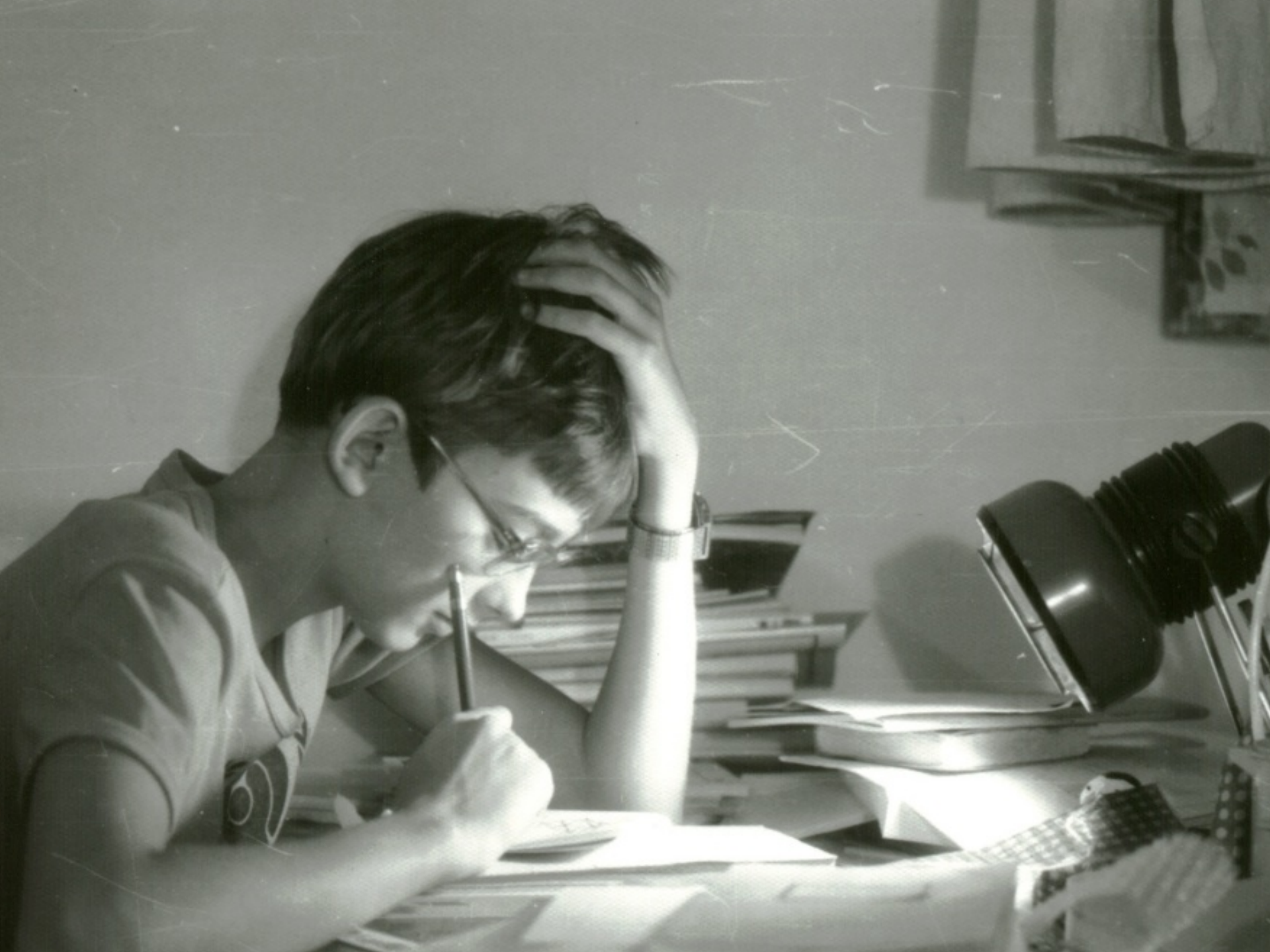
- I say some words about the other main subject of Zoli far from the preceding talks, & about his first steps in maths

- Jean Fonlupt speaks about his first steps in France

- Roland Grappe and Nguyen Viet Hằng speak about Zoli's scientific descendence

- Nadia Brauner tells us about `Zoli and children'

**Unscheduled part** : Please, take part at any time !



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1. Orientations and Connectivity

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# Theses

**Z. Szigeti**, *T-joins and T-cuts,* Master's Thesis, 1991, (en hongrois)

**Z. Szigeti**, *On conservative weightings of graphs,* Ph. D. Thesis, 1994, (en anglais)

**Z. Szigeti**, *Parity in graph theory,* Habilitation Thesis, 2000, (en français)

# Starting step

## two halves make a whole

**First Half**

Z. Szigeti : On Seymour Graphs, Report No. 93803-OR, Research Institute for Discrete Mathematics, Bonn

Unpublished Manuscript

Seymour graphs: A rich class in which a certain minmax theorem holds, where
**min contains** : postman, undir. min weight paths,…
**max contains** : routing

**Second Half**

A. Ageev, A. Kostochka : A characterization of Seymour Graphs

Unpublished Manuscript

# A Characterization of Seymour Graphs *

A. A. Ageev and A. V. Kostochka

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## Abstract

Following Gerards [1] we say that a connected undirected graph $G$ is a *Seymour graph* if the maximum number of edge disjoint T-cuts is equal to the cardinality of a minimum T-join for every even vertex subset $T \subseteq V(G)$. Several families of graphs have been shown to be subfamilies of Seymour graphs (Seymour [5][6], Gerards [1], Szigeti [7]). In this paper we prove a characterization of Seymour graphs which was conjectured by Sebő and implies the results mentioned above.

**szuper@ludens.elte.hu,15:43 11/04/94 +...,**

Date: Mon, 11 Apr 1994 15:43:43 +0200
From: szuper@ludens.elte.hu
To: andras.sebo@imag.fr

szia andras,

nagyon roviden vazolnam a dolgokat.

eloszoor is mindjart elkuldom neked a kosztocska-ageev paros cikkenek uj valtozatat. szerintem neked meg az eredeti teljesen rossz verzio van meg. ez teljesen jol olvashato es ertheto. tulajdonkeppen nagyon egyszeru dolgok tortennek. lemma 1 a lenyeg es az vilagos. (tulajdonkeppen elegge hasonlit a bizonyitas az en gerards tetelre adott bizonyitasomra, amit annak idejen bonnban elmeseltem neked.) szoval ez eleg konnyen emeszthetо.

problema a tetel 1-gyel van. azt a feltetelt, amelyik azt mondja, hogy (*) $G-C$ osszefuggo minden $G-X_i$-beli $C$ komponensre, azt torolni kell. de mivel itt ez a feltetel nincs is felhasznalva, ezert nincs is baj. ez a feltetel magahoz az egyes tetel bizonyitasahoz kellett a kosztocskanak.

azonban ahol neki szukseg volt erre a feltetelre ott nekem sikerult megnutatnom, hogy e nelkul is megy.

# List of Publications

## ARTICLES DE REVUES

**A. Frank, Z. Szigeti**, *On packing T-cuts* (**pdf**), Journal of Combinatorial Theory, Series B, Vol. 61. No. 2. (1994) 263-271.

**A. Frank, Z. Szigeti**, *A Note on Packing Paths in Planar Graphs* (**pdf**), Math. Program. 70 (1995) 201-209

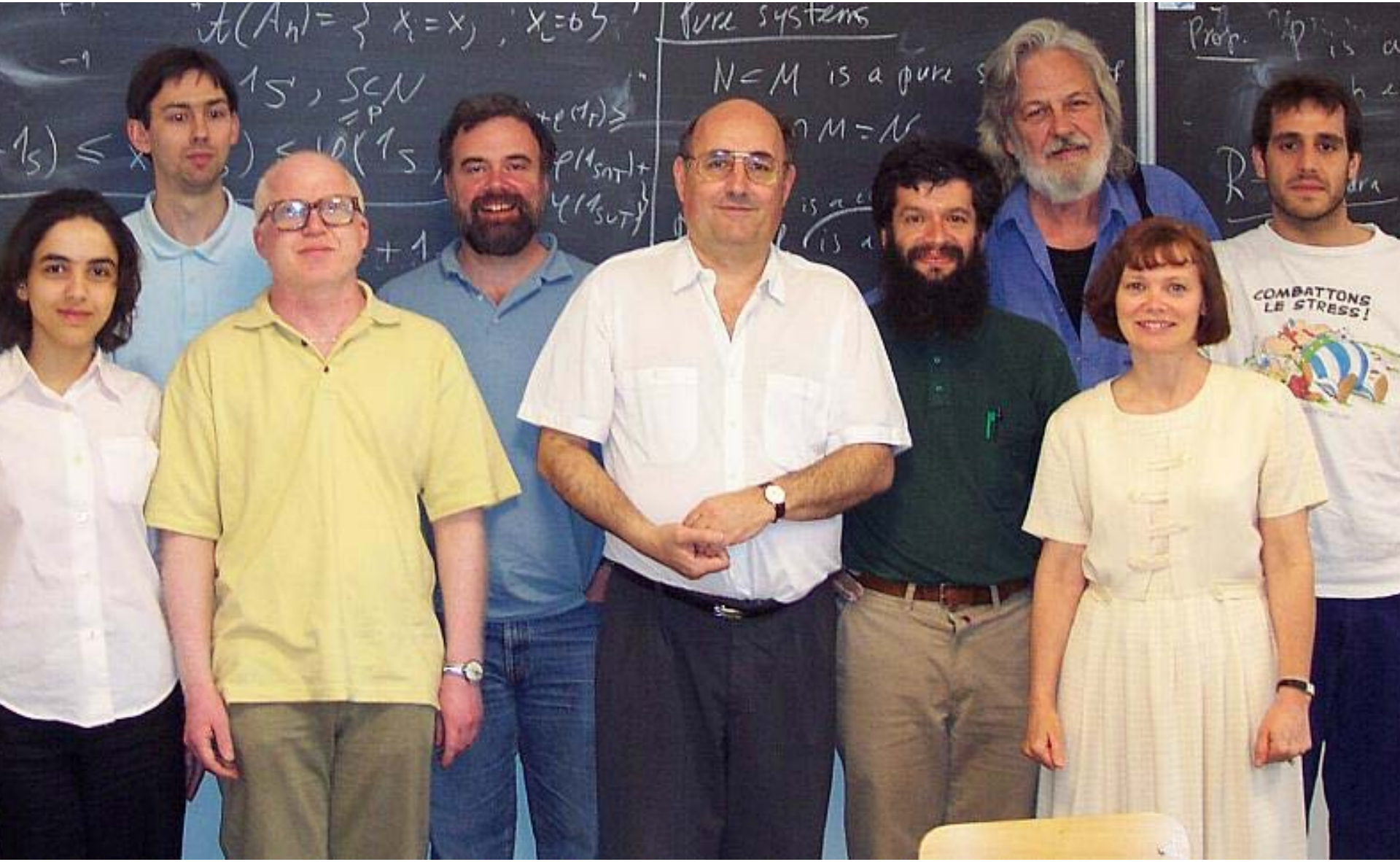
**Z. Szigeti**, *On a matroid defined by ear-decompositions of graphs* (**pdf**), Combinatorica 16 (2) (1996) 233-241

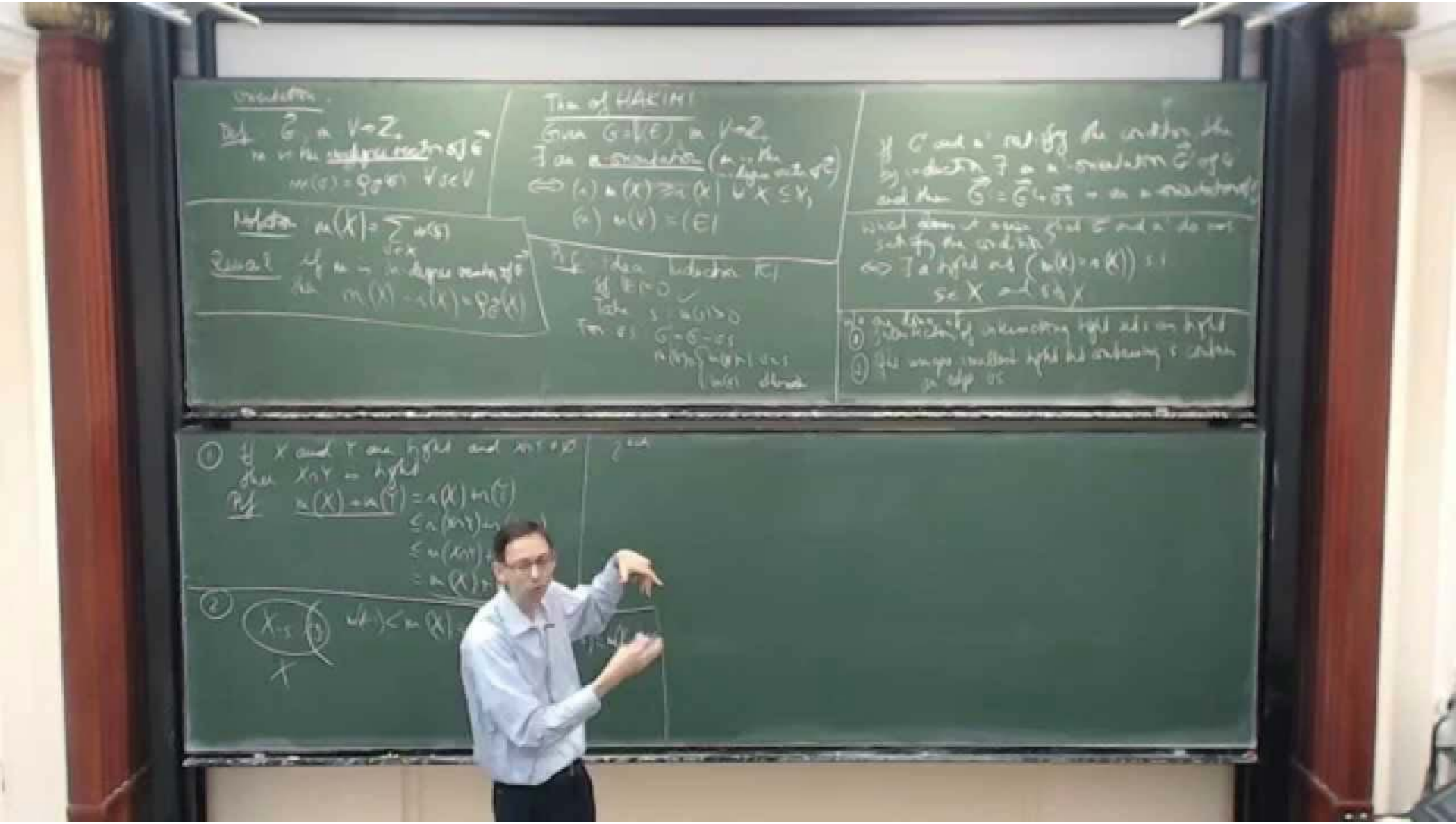
**A. Ageev, A. Kostochka, Z. Szigeti**, *A Characterization of Seymour Graphs* (**pdf**), Journal of Graph Theory, Vol. 24, No. 4, (1997) 357-364

**Z. Szigeti**, *The two ear theorem on matching covered graphs* (**pdf**), Journal of Combinatorial Theory, Series B, 74 (1998) 104-109

**Z. Szigeti**, *Hypergraph connectivity augmentation* (**pdf**), Math. Program. 84: (1999) 519-527

**J. Bang-Jensen, H. Gabow, T. Jordán, Z. Szigeti**, *Edge-connectivity augmentation with partition constraints* (**postscript**), SIAM Journal on Disc. Math. Vol. 12 No. 2 (1999) 160-207


Pure systems
N=M is a pure
COMBATTONS LE STRESS!


Thm of HAKIMI
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Proof

# List of Publications cont'd

**J. Cheriyan, A. Sebõ, Z. Szigeti**, *Improving on the 1.5-approximation of a smallest 2-edge connected spanning subgraph* (**postscript**), SIAM Journal on Disc. Math. Vol. 14, No. 2, (2001) 170-180.

**A. Frank, T. Jordán, Z. Szigeti**, *An orientation theorem with parity conditions* (**pdf**), Discrete Applied Mathematics, 115 (2001) 37-47.

**Z. Szigeti**, *On generalizations of matching-covered graphs* (**pdf**), European Journal of Combinatorics, (2001) 22 865-877.

**Z. Szigeti**, *Perfect matchings versus odd cuts* (**postscript**), Combinatorica, 22 (4) (2002) 575-589.

**Z. Szigeti**, *The graphic matroid parity problem* (**pdf**), Journal of Combinatorial Theory / Series B, 88/2 (2003) 247-260.

**T. Jordán, Z. Szigeti**, *Detachments preserving local edge-connectivity of graphs* (**postscript**), SIAM Journal on Disc. Math. Vol 17, No. 1, (2003) 72-87.

# List of Publications cont'd

**Z. Szigeti**, *On a min-max theorem on bipartite graphs* (**pdf**), Discrete Mathematics, Special issue: 6th Int. Conf. on Graph Theory, eds.: J.-L. Fouquet, I. Rusu, Vol. 276/1-3, (2004) 353-361.

**Z. Király, Z. Szigeti**, *Simultaneous well-balanced orientations of graphs* (**pdf**), Journal of Combinatorial Theory, Series B, 96 (2006) 684-692.

**R. Grappe, Z. Szigeti**, *Covering symmetric semi-monotone functions* (**pdf**), Discrete Applied Mathematics 156 (2008) 138-144.

**Z. Szigeti**, *Edge-splittings preserving edge-connectivity of graphs* (**pdf**), Discrete Applied Mathematics, 156 (2008) 1011-1018.

**Z. Szigeti**, *Edge-connectivity augmentation of graphs over symmetric parity families* (**pdf**), Discrete Mathematics 308 (2008) 6527-6532.

**Z. Szigeti**, *On edge-connectivity augmentation of graphs and hypergraphs* (**pdf**), W. Cook, L. Lovász, J. Vygen (Editors): Research Trends in Combinatorial Optimization. Springer, Berlin 2009, 483-521.

**A. Bernáth, S. Iwata, T. Király, Z. Király, Z. Szigeti**, *Recent results on well-balanced orientations* (**pdf**), Discrete Optimization 5 (2008) 663-676.

# List of Publications cont'd

A. **Bernáth, S. Iwata, T. Király, Z. Király, Z. Szigeti**, *Recent results on well balanced orientations* (**pdf**), Discrete Optimization 5 (2008) 663-676.

**N. Jami, Z. Szigeti**, *Edge-connectivity of permutation hypergraphs* (**pdf**), Discrete Mathematics 312 (2012) 2536-2539.

**O. Durand de Gevigney, V. H. Nguyen, S. Klein, Z. Szigeti,** *Sandwich problems on orientations* (**pdf**), Journal of the Brazilian Computer Society: Volume 18, Issue 2 (2012), 85-93.

**Rautenbach, Z. Szigeti,** *Greedy colorings of words* (**pdf**), Discrete Applied Mathematics 160 (2012) 1872-1874.

**Bernáth, R. Grappe, Z. Szigeti,** *Augmenting the edge-connectivity of a hypergraph by adding a multipartite graph* (**pdf**), Journal of Graph Theory, 72/3 (2013) 291-312.

**Durand de Gevigney, V. H. Nguyen, Z. Szigeti**, *Matroid-based packing of arborescences* (**pdf**), SIAM Journal on Disc. Math. Vol. 27 No. 1 (2013) 567-574.

**Cheriyan, O. Durand de Gevigney, Z. Szigeti**, *Packing of rigid spanning subgraphs and spanning trees* (**pdf**), Journal of Combinatorial Theory, Series B, Volume 105, (2014) 17-25.

# List of Publications cont'd

A. **Bernáth, R. Grappe, Z. Szigeti**, *Covering symmetric crossing supermodular functions by partition constraints* (**pdf**), SIAM Journal on Disc. Math. 31/1 (2017) 335-382.

**Q. Fortier, Cs. Király, M. Léonard, Z. Szigeti, A. Talon**, *Old and new results on packing arborescences* (**pdf**), accepté dans Discrete Applied Mathematics

**O. Durand de Gevigney, Z. Szigeti**, *On (2k,k)-connected graphs* (**pdf**), soumis à Journal of Graph Theory (2017)

**Q. Fortier, Cs. Király, Z. Szigeti, S. Tanigawa,** *On packing spanning arborescences with matroid constraints,* (**pdf**), soumis à Combinatorica (Egres Technical Report No. TR-2016-18. Eötvös University) (2017)

**O. Durand de Gevigney, Z. Szigeti**, *On minimally 2-T-connected graphs* (**pdf**), soumis à Discrete Applied Mathematics (Egres Technical Report No. TR-2017-05. Eötvös University) (2017)

**T. Matsuoka, Z. Szigeti,** *Polymatroid-Based Capacitated Packing of Branchings,* (**pdf**), soumis à Mathematical Programming (Technical Report No. METR 2017-15, University of Tokyo) (2017)

# Conferences

**Z. Szigeti**, *On Lovász's Cathedral Theorem* Proceedings of the Third Conference on Integer Programming and Combinatorial Optimization, eds.: G. Rinaldi, L.A. Wolsey, (1993) 413-423.

A. **Ageev, A. Kostochka, Z. Szigeti**, *A Characterization of Seymour Graphs*, Proceedings of the fourth Conference on Integer Programming and Combinatorial Optimization, eds.: E. Balas, J. Clausen, (1995) 364-372.

**J. Bang-Jensen, H. Gabow, T. Jordán, Z. Szigeti**, *Edge-connectivity augmentation with partition constraints,* Proc. 9th Annual ACM-SIAM Symp. on Disc. Alg. (1998) 306-315.

**J. Cheriyan, A. Sebõ, Z. Szigeti**, *Improving on the 1.5-approximation of a smallest 2-edge connected spanning subgraph,* Proceedings of the sixth Conference on Integer Programming and Combinatorial Optimization, eds.: Bixby, Boyd, Rios-Mercado, (1998) 126-136.

**Z. Szigeti**, *On a min-max theorem of cacti,* Proceedings of the sixth Conference on Integer Programming and Combinatorial Optimization, eds.: Bixby, Boyd, Rios-Mercado, (1998) 84-95.

**Z. Szigeti**, *On optimal ear-decompositions of graphs,* Proc. 7th IPCO Conference, Graz, LNCS 1610, Springer, (1999) 415-428.

A. **Frank, T. Jordán, Z. Szigeti, *An orientation theorem with parity conditions,* Proc. 7th IPCO** Conference, Graz, LNCS 1610, Springer, (1999) 183-190.

**Z. Szigeti**, *On min-max results in matching theory,* 6th International Conference on Graph Theory, (Marseille, 2000), Electron. Notes Dicrete Math., 5, Elsevier, Amsterdam, (2000) 291-294.

# Conferences cont'd

**Z. Szigeti**, *The nightmare of Mr Orient or orientation of graphs,* ROADEF 2003, extended abstract, Avignon, (2003) 212-213.

**Z. Szigeti**, *On the local splitting off theorem,* GRACO 2005, 2nd Brasilian Symposium on Graphs, Algorithms and Combinatorics, Electron. Notes Dicrete Math., 19, Elsevier, (2005) 57-61.

**S. Iwata, T. Király, Z. Király, Z. Szigeti**, *On well-balanced orientations,* Proceedings of 4th Japanese Hungarian symposium on Discrete Mathematics and its Application, 2005

**R. Grappe, A. Bernáth, Z. Szigeti,** *Augmenting the edge-connectivity of a hypergraph by adding a multipartite graph,* Electron. Notes in Discrete Math. 34 (2009) 173-177.

**A. Bernáth, R. Grappe, Z. Szigeti,** *Partition constrained covering of symmetric crossing supermodular functions,* Proc. of Annual ACM-SIAM Symp. on Disc. Alg. (2010) 1512-1520.

**Z. Szigeti**, *On orientations of graphs,* Matemática Contemporânea, Vol 39 (2010) 179-188.

**A. Ageev, Y. Benchetrit, A. Sebõ, Z. Szigeti,** *An excluded minor characterization of Seymour graphs,* Proc. 15th IPCO Conference, New York, LNCS 6655, Springer, (2011) 1-13.

**Cs. Király, Z. Szigeti,** *Reachability-based matroid-restricted packing of arborescences,* Proceedings of the 10th Hungarian-Japanese Symposium on Discrete Mathematics and Its Applications, 2017, Budapest, Hungary

**Q. Fortier, Cs. Király, Z. Szigeti, S. Tanigawa,** *On packing spanning arborescences with matroid constraints,* Electron. Notes Dicrete Math., 61, (2017) 451-457.

## ARTICLES EN PREPARATION

**A. Ageev, Y. Benchetrit, A. Sebõ, Z. Szigeti,** *An excluded minor characterization of Seymour graphs.*

## LIVRES EN PREPARATION

**Z. Szigeti, M. Preissmann**, *Optimisation Combinatoire et Graphes: Exercices et Solutions,* 300 pages, **Premiers deux chapitres** (**pdf**)

## RAPPORTS DE RECHERCHE RECENTS

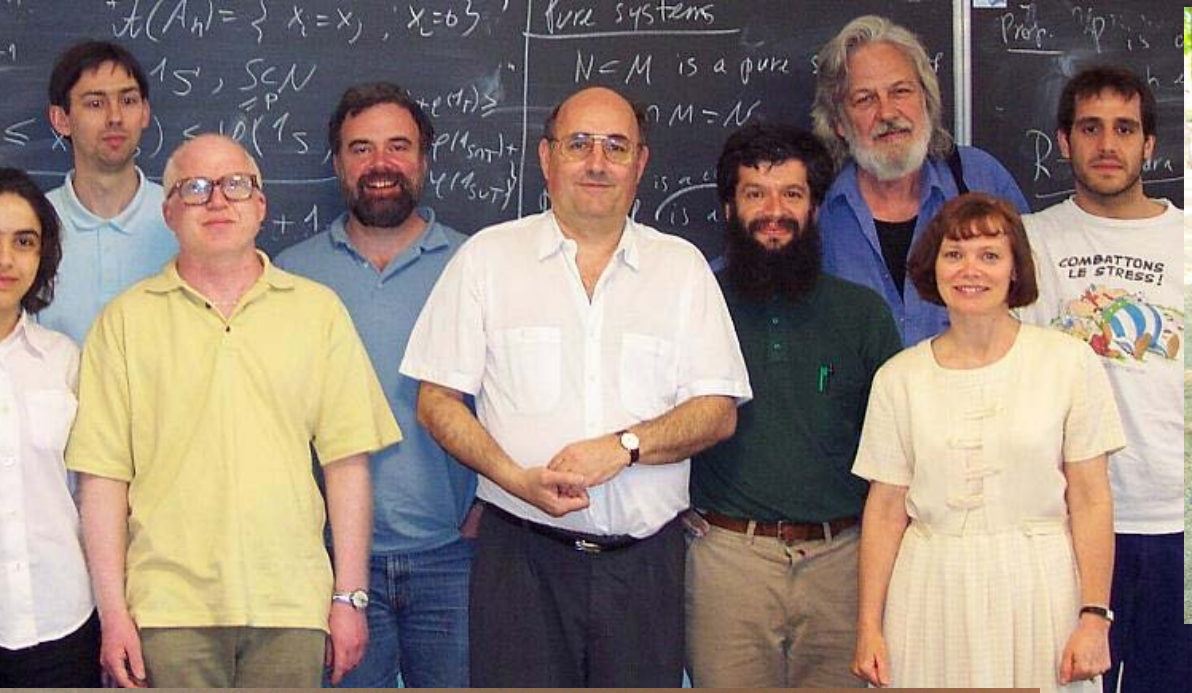
**Z. Szigeti, S. Tanigawa,** *An algorithm for the problem of minimum weight packing of arborescences with matroid constraints,* Technical Report No. METR 2017-14, University of Tokyo, (2017)

## MANUSCRITS

**Z. Szigeti**, *On Seymour Graphs,* Report No. 93803-OR, Research Institute for Discrete Mathematics, Universität Bonn, 1993

**D. Rautenbach, Z. Szigeti**, *Simultanous large cuts,* Report No. 04937-OR, Research Institute for Discrete Mathematics, Universität Bonn, 2004,

**Q. Fortier, M. Léonard, Z. Szigeti, A. Talon**, *Old and new results on packing arborescences* (**pdf**), G-SCOP, Grenoble, 2016


Pure systems
N=M is a pure
COMBATTONS LE STRESS!


Many

Happy

Returns

Of the Day,

Zoli !