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PREFACE

Multiple Faces of Optimization

A Tribute to Tamás Terlaky on his 70th Birthday

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This is the first of two issues of the Vietnam Journal of Mathematics dedicated to Tamás Terlaky on the occasion of his 70th birthday. 11 papers are presented in this publication, Issue 3 of Volume 53. The others will be presented in Issue 4 of Volume 53. All the papers of these two issues were rigorously peer reviewed. We thank the authors and the reviewers for their contribution.

Tamás Terlaky was born in Kaposvár, Hungary and finished elementary and secondary school education in his hometown. He graduated in Mathematics from Eötvös Loránd University (ELTE), Budapest in 1979. Under the supervision of Prof. Emil Klafszky, he finished and defended his doctoral (dr.univ.) thesis in 1981 at ELTE. Major results of his thesis were published in his paper on l_p optimization [35]. During his early academic career, Ter-

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laky worked on introducing new pivot algorithms for linear optimization (LO) and oriented matroid optimization [37]. In particular, Terlaky developed a finite *criss-cross algorithm* (CCA) [34] for linear optimization problems that visits some (possibly both primal and dual infeasible) basic solutions until either primal infeasibility, dual infeasibility or optimality is detected. This pivot algorithm can be started with any basic solution and solves a linear optimization problem in one phase, in a finite number of pivot steps. Finiteness of the CCA was ensured by using the minimal index rule.

Terlaky was member of the Department of Operations Research at ELTE and taught linear and nonlinear optimization, and operations research primarily for students of mathematics from 1981 until 1989. Between 1989 and 1999 Terlaky was teaching operations research courses at the Delft University of Technology. From 1999 to 2008, he was Professor at the Department of Computing and Software at McMaster University, where he held a Canada Research Chair in Optimization and served as founding director of the School of Computational Engineering and Science.

In 2008, Terlaky joined Lehigh University where he currently holds the Alcoa Endowed Chair Professor. From 2008 to 2017, he served as the Chair of the Industrial and Systems

Engineering Department. Since 2020 he is Director of the Quantum Computing and Optimization Laboratory (QCOL). During this time, Terlaky also served as Vice President of INFORMS and Chair of the SIAM Activity group on Optimization, founding Chair of EUROPT, and subsequently was recognized as Honorary Chair of EUROPT.

Terlaky has received numerous awards for his academic work. He was awarded the title of Doctor of the Hungarian Academy of Sciences (DSc) in 2006, primarily in recognition for his achievements in the development of interior point algorithms (IPA) for linear and semidefinite optimization. Other awards that Terlaky has received include the H. Wagner Prize from INFORMS; the Outstanding Innovation in Service Systems Engineering award from IISE; the Award of Merit of the Canadian Operational Research Society; the Egerváry Award by the Hungarian Operations Research Society; and the the MITACS Mentorship Award. Terlaky is the founding editor-in-chief of the journal Optimization and Engineering (OPTE), editor-in-chief of the Journal of Optimization Theory and Applications, and serves as associate editor of other seven journals, including the Vietnam Journal of Mathematics. He is a Fellow of the Fields Institute, Fellow of INFORMS, Fellow of SIAM, Fellow of IFORS, and Fellow of the Canadian Academy of Engineering.

Throughout his 45-year academic career, Terlaky found the greatest fulfillment in mentoring master's and doctoral students. Over 20 of his doctoral students, and many of their own students, continue to carry on Terlaky's research legacy through their academic publications, seminar presentations, and scientific discussions.

1 Research Results in Some of His Favorite Topics

Well beyond the contributions to linear optimization already mentioned, Terlaky's research work has been remarkably impactful in a wide range of areas. We complete this biographical sketch by briefly mentioning some of these contributions, with an emphasis on his landmark contributions in the area of interior-point algorithms.

Linear Optimization Among those researchers who worked on algorithms for linear optimization, Tamás Terlaky is one of the rare examples, who obtained important results both in pivot- and interior point algorithms. In the second paragraph, we have listed his most important achievements in connection with his dissertation(s).

The question arises: how many scientific dissertations did a researcher have to write during his/her career in Hungary before 1990 if he/she wanted to fulfill his/her career? The answer was three! Therefore, Tamás after defending his dr. univ. dissertation at ELTE in 1981 on l_p optimization, turned his attention to an open question in linear optimization (LO); namely, whether there exists a finite pivot algorithm that solves any LO problem in a single phase. The well-known result in this direction was a paper by Zionts [42]. However, Zionts was able to prove the finiteness of his algorithm only under a quite artificial assumption that many LO problems do not satisfy. Terlaky introduced a simpler CCA [34] equipped with the minimal index rule, and in an elegant way, proved its finiteness. All his results related to CCA have been summarized in the *thesis for candidate of science*, submitted and defended at the Hungarian Academy of Sciences, Department of Mathematics in 1985, and published as a book [36] in Hungarian.

In a series of papers after his second scientific dissertation, Tamás and his coauthors extended CCA to linearly constrained convex quadratic problems [22], oriented matroids [14] and linear complementarity problems (LCPs) with sufficient matrices [16]. His achievements in CCA are very interesting and unique, however international recognition came to him only in 1997, when he was invited to be a semi-plenary speaker at the International Symposium on Mathematical Programming (ISMP) in Lausanne. Important results related to CCAs have been published in the seminal paper by Fukuda and Terlaky [15].

From this period of Terlaky's work, we would like to highlight a less well-known but significant theorem (Theorem 3.1. in [6]); namely, the alternative theorem of LCPs, which in its original form in the oriented matroids setting was published in [14].

Karmarkar [21] submitted his seminal paper into the journal *Combinatorica* that had its editorial office exactly in the same building of ELTE, where Tamás Terlaky was working as an assistant professor. This fact, coupled with the revolution of IPAs in the field of LO, naturally influenced Terlaky's research interest towards IPAs.

Interior-point algorithms Terlaky has been working on interior point algorithms for various classes of convex optimization problems since 1985, and most of his doctoral students have also earned degrees working on this field. One of Tamás' important research areas is still related to IPAs. Currently, he and his PhD students are researching how IPAs should be implemented on quantum computers and what is the efficiency and complexity of these algorithms on a quantum computing environment.

His leadership in the quantum computing optimization area was recently recognized by the invitation to deliver the opening plenary lecture at the 2024 International Symposium on Mathematical Programming in Montreal.

Even listing Tamás' most important results related to IPAs goes beyond the scope of this tribute, but fortunately Tamás, his PhD students, and co-authors have helped us with collecting their most important results in some books. The book of Roos, Terlaky and Vial [30] contains many important results (self-dual linear optimization problem, self-dual embedding, duality theory, logarithmic barrier approach, rounding procedure and many others) on IPAs published by the authors and other researchers active on IPAs for LO. In 2000, Terlaky developed an easy way to discuss basic theory of LO using IPAs [38] that influenced the teaching of IPAs and opened an opportunity to rework many parts of IPAs for LO. This new, simpler approach led to the second book of Roos, Terlaky and Vial [31] that in some sense is a revised version of the first book. The first four chapters have been influenced by Terlaky's paper [38]; however, the discussion of the central path, for instance (Section 2.7) has a unique flavor, including nice results based on original ideas. Furthermore, Chapters 16 (more properties of the central path), 17 (higher-order methods) and 19 (parametric and sensitivity analysis) reflect on new results and approaches developed since 1996.

During the close collaboration of Roos and Terlaky (1989–1999), it often happened that the next PhD student would follow the track of the previous one, and in this way the group's attention from IPAs for LO, turned to IPAs for semidefinite optimization (SDO). E. de Klerk as a PhD student of Roos and Terlaky at TU Delft, mainly worked on IPAs for SDO, and published 6 papers with his supervisors on this area. De Klerk summarized the results of his Phd thesis (Chapters 2–8) in Part I of his book [7], while the Part II consists of five interesting applications of SDO.

The last topic of IPAs that Roos and Terlaky started to study together was related to the complexity results of large-update IPAs. It is well-known that the theoretical iteration bound for most classical large-update IPAs based on the logarithmic barrier function is worse than that of the small-update IPAs. However, the computational performance of the algorithms elicits the opposite relation; namely, the large-update IPAs perform computationally much better than the small-update ones. In a sequence of papers, Roos and Terlaky with last joint PhD student, Jiming Peng, developed the concept of self-regular functions and the related self-regular proximity measures for different classes of problems like LO, SDO, second order conic optimization and $P_*(\kappa)$-LCPs. Their results have been summarized in the book on self-regularity [27] that represents one of the major developments in the field of complexity analysis of IPAs in the early years of 2000. Large-update IPAs using new directions based on self-regular functions enjoy better polynomial complexity than those based on the classical logarithmic barrier function. However, the existing gap between the complexity results of small- and large-update method has not been closed completely.

Finite termination of IPAs is a crucial theoretical and practical question for LOs, monotone LCPs and $P_*(\kappa)$-LCPs. Even for LOs it was not well-known among operations researchers during the 1990s that exact optimal solution could be computed using IPAs together with a *rounding procedure* (see [30, 31]). Several misunderstandings in comparison of pivot- and interior point algorithms were eliminated by the paper of Illés and Terlaky [20]. Finite termination of IPAs for $P_*(\kappa)$-LCPs [19] is proved by computing bounds on the magnitude of the variables in the vicinity of the central path, when the complementarity gap is small enough. After having an interior-point solution with small enough complementarity gap in a certain neighborhood of the central path, a strongly polynomial rounding procedure can be started that provides a maximally complementary (exact) solution.

In general, LCP belongs to the class of NP-complete problems [5], therefore, any progress in (approximately) solving LCPs would straightforwardly imply a progress in (approximately) solving several NP-hard problems. The first natural question in this direction was whether the EP (existentially polynomial time) Theorem of Fukuda et al. [13] (see Theorem 1, [18]) or a variant of it could be proven by a properly developed version of an IPA or not? Illés, Nagy and Terlaky in their paper [18] introduced IPAs in EP form for general LCPs. IPAs in EP form in polynomial time of iteration (see Theorem 15, [18]) either solves the LCP with any arbitrary matrix, or give a certificate that the matrix is not $P_*(\widetilde{\kappa})$, where $\widetilde{\kappa} > 0$ is a given (arbitrary big) number. Using such IPAs in EP form (Section 3, [18]) an interesting variant (Theorem 16, [18]) of the EP theorem of Fukuda et al. [13] could be proved using IPAs in EP form. Further IPAs in EP form were developed in [17]. The opportunities behind this approach in solving specially structured, general LCPs (the matrix of the problem is not $P_*(\kappa)$-matrix) have not been exploited yet.

It has long been known that the solution of LO problems is influenced by redundant inequality constraints. It is also known that deciding whether an inequality constraint is redundant or not requires solving a LO problem. Thus, representing a LO problem with the necessary required number of constraints effects the solution efficiency. From the other point of view, it is clear that the structure of the LO problem constraints influence the location of the central path inside of the feasible polyhedron. These observations led to the idea of constructing bad LO problem examples for IPAs. A natural candidate for developing such LO problem was the Klee-Minty cube. The task was to find redundant constraints that ensure that IPAs will visit a prescribed small neighborhood of each vertex of the Klee-Minty cube. In a series of papers [9–11, 25, 26] Terlaky and his co-authors developed connections between the diameter of a polytope and the largest total curvature of the central path, and showed that with exponential number of redundant constraints the efficient complexity of IPAs can be broken.

Copositive optimization In the early 2000s, Terlaky and collaborators showed that a fundamental NP-hard; namely, the standard quadratic optimization problem (StQP), can be reformulated as a copositive optimization problem; that is, a conic (and therefore convex) optimization problem over the cone of copositive matrices [4]. Although copositive matrices had been very well studied in mathematics, this work can be regarded as one of the first, if not the first time these matrices played an important role in optimization. Indeed this type of copositive reformulation of the StQP opened the door for the use of novel techniques from convex optimization and algebraic geometry to address the solution of this NP-hard problem. This seminal work was followed by numerous important results showing how fundamental NP-hard combinatorial optimization problems and in more generality non-convex optimization problems can be reformulated as copositive optimization problems (see, e.g., [12]). In fact, copositive optimization is now known as a well defined and rich area of research within optimization.

Real-world decision-making Terlaky has also contributed to the solution of some particular, relevant, and challenging real-world decision-making problems. For example, he introduced new techniques that allow to design large-scale truss topology structures (see, e.g., [32]); compute synthetic seismograms in acoustic and elastic wave problems [41]; compute optimal loading schemes in nuclear reactor fuel management (see, e.g., [8, 29]); optimize the way inmates are assigned to correctional institutions [33] (an accomplishment that was recognized with the H. Wagner Prize from INFORMS); accurately interpret results from magnetic resonances [1]; and to solve routing problems in VLSI technology design [39].

A survey of the S-lemma It is very rare in the field of optimization, or even in the entire field of mathematics, for a research topic to impact different research areas and develop in parallel, without minimal interactions. The basic idea of the S-lemma or S-procedure came from control theory but it has deep influence in quadratic and semidefinite optimization, geometry, and linear algebra, too. The systematic and unified review of S-lemma by Pólik and Terlaky [28] presents similar results from different fields. The list of applications of the S-lemma from the classical one in control varies to trust region and algebraic geometric problems, computational geometry questions, complexity issues and many more. Their unified handling of research related to the S-lemma, started a new and very influential wave of applications and pure research in related fields. Still after 17 years of the publication of their review, on average 30–40 new research papers are published yearly related to the S-lemma, highlighting the importance of this single review paper.

Quantum Computing Optimization After decades of successfully designing and implementing algorithms to solve large classes of optimization problems such as linear, second-order, and semidefinite optimization problems on classical computing devices, Terlaky has recently focused in achieving the same goal on quantum computing devices. Considered and studied since the 1980 s, these quantum computing devices have now become a reality and have the potential to revolutionize the way we solve complex decision-making problems. While most of the work on achieving this potential has focused on the design of algorithms that allow quantum computing devices to solve combinatorial optimization problems, Terlaky has focused on the design of algorithms that allow quantum computer devices to solve continuous optimization problems. For this purpose, Terlaky has been working on extending classical interior-point algorithms to work in the quantum computing realm. In just five years, Terlaky has made exceptional advances in this direction by designing quantum computing algorithms for semidefinite (see, e.g., [3]) and linear (see, e.g., [40]) optimization problems that complexity-wise are faster than classical computing algorithms in terms of the problems' dimensions. Still, important challenges remain due to the heightened need to control the Newton Systems' ill-conditioning in quantum computing, a challenge that Terlaky and collaborators has been successfully addressing by making a very clever use of classical iterative refinement techniques (see, e.g. [24]), and the cost associated with the need to iteratively read the current solution iterate from the quantum device, a challenge that Terlaky and collaborators are addressing by recasting the IPA as the problem of solving an appropriate instance of Schrödinger's equation [2]. Besides impacting quantum computing, this line of research has also produced very relevant, quantum inspired, classical computing optimization results (see, e.g., [23]).

2 Overview of the Work of Tamás Terlaky

Tamás Terlaky is renowned internationally for his contributions to the theory and practice of interior-point methods. He is one of the most accomplished experts in optimization (both theory and high performance computational methodology) and its engineering applications. He is one of the leading researchers on interior point methods since 1985, having co-authored three highly influential books in the area that have together garnered 1800 citations in the scientific literature. He has also published more than 200 research papers, demonstrating a sustained flow of fundamental theoretical contributions in linear, quadratic, second-order cone and semidefinite optimization, as well as the criss-cross method for linear optimization problems that he generalized to linear complementarity problems and oriented matroids. It is noteworthy that he has published with over 100 collaborators and these collaborations span the globe, demonstrating the truly international scope in his research activities.

Tamás was among the early contributors to computational methods in optimization. He is co-author of several seminal papers on computational methods of interior point algorithms for linear and conic optimization problems.

Among his most notable contributions is an implementation of a primal-dual interior-point method for solving large-scale sparse conic quadratic optimization problems using a homogeneous and self-dual model. This work has had a continuing major impact on the computational approaches and software for conic optimization problems.

The impact of Tamás' work goes well beyond his academic contributions and into the practical impact of optimization and OR. His former students are employed as leading software developers in the top optimization software providers, such as CPLEX, SAS, Gurobi, FICO-XPRESS-MP, and MOSEK. He has led projects in various countries on a large array of applications of optimization, including oil refining, frequency assignment, robust water management, VLSI design, signal processing, nuclear reactor scheduling, IMRT and high precision proton therapy treatment, and inmate assignment optimization for prison systems. This last endeavour earned him and his co-authors the 2017 D.H. Wagner Prize for Excellence in Operations Research Practice from INFORMS, and led to the creation of Optamo LLC, a unique start-up commercializing optimization systems for correctional systems that was awarded the IISE Outstanding Innovation in Service Systems Engineering Award for 2019. Terlaky has thus shown his ability to drive not only ground-breaking innovative research but also the development of the research results through to commercialization and economic impact.

The long and productive career of Tamás Terlaky is characterized by a strong leadership in research, practice and service to the international operational research community. Thanks to his insightful and broad view of operational research, he has always been able to identify promising cutting-edge mathematical optimization trends and make sustained scientific contributions that constitute a remarkable combination of theory, software and applications. He remains a global leader who keeps abreast of emerging domains like quantum optimization that are at the forefront of mathematics today.

Together with all contributors, we warmly thank Tamás Terlaky and wish him all the best in the future.

References

1. Anand, C.K., Sotirov, R., Terlaky, T., Zheng, Z.: Magnetic resonance tissue quantification using optimal bSSFP pulse-sequence design. Optim. Eng. **8**, 215–238 (2007)
2. Augustino, B., Leng, J., Nannicini, G., Terlaky, T., Wu, X.: A quantum central path algorithm for linear optimization. arXiv:2311.03977 (2023)
3. Augustino, B., Nannicini, G., Terlaky, T., Zuluaga, L.F.: Quantum interior point methods for semidefinite optimization. Quant. **7**, 1110 (2023)
4. Bomze, I.M., Dür, M., de Klerk, E., Roos, C., Quist, A.J., Terlaky, T.: On copositive programming and standard quadratic optimization problems. J. Global. Optim. **18**, 301–320 (2000)
5. Chung, S.J.: NP-completeness of the linear complementarity problem. J. Optim. Theory Appl. **60**, 393–399 (1989)
6. Csizmadia, Zs., Illés, T.: New criss-cross type algorithms for linear complementarity problems with sufficient matrices. Optim. Methods Softw. **21**, 247–266 (2006)
7. de Klerk, E.: Aspects of Semidefinite Programming: Interior Point Algorithms and Selected Applications. Kluwer Academic Pubishers, Dordrecht (2002)
8. de Klerk, E., Roos, C., Terlaky, T., Illés, T., de Jong, A.J., Valkó, J., Hoogenboom, J.E.: Optimization of nuclear reactor reloading patterns. Ann. Oper. Res. **69**, 65–84 (1997)
9. Deza, A., Nematollahi, E., Peyghami, R., Terlaky, T.: The central path visits all the vertices of the Klee-Minty cube. Optim. Methods Softw. **21**, 851–865 (2006)
10. Deza, A., Nematollahi, E., Terlaky, T.: How good are interior point methods? Klee-Minty cubes tighten iteration-complexity bounds. Math. Program. **113**, 1–14 (2008)
11. Deza, A., Terlaky, T., Zinchenko, Y.: Polytopes and arrangements: Diameter and curvature. Oper. Res. Lett. **36**, 215–222 (2008)
12. Dür, M.: Copositive programming-a survey. In: Diehl, M., et al. (eds.) Recent Advances in Optimization and its Applications in Engineering: The 14th Belgian-French-German Conference on Optimization, pp. 3–20. Springer, Berlin, Heidelberg (2010)
13. Fukuda, K., Namiki, M., Tamura, A.: EP theorems and linear complementarity problems. Discrete Appl. Math. **84**, 107–119 (1998)
14. Fukuda, K., Terlaky, T.: Linear complementarity and oriented matroids. J. Oper. Res. Soc. Jpn. **35**, 45–61 (1992)
15. Fukuda, K., Terlaky, T.: Criss-cross methods: A fresh view on pivot algorithms. Math. Program. **79**, 369–395 (1997)
16. den Hertog, D., Roos, C., Terlaky, T.: The linear complementarity problem, sufficient matrices, and the criss-cross method. Linear Algebra Appl. **187**, 1–14 (1993)

17. Illés, T., Nagy, M., Terlaky, T.: Polynomial interior point algorithms for general linear complementarity problems. Algorithmic Oper. Res. **5**, 1–12 (2010)
18. Illés, T., Nagy, M., Terlaky, T.: A polynomial path-following interior point algorithm for general linear complementarity problems. J. Glob. Optim. **47**, 329–342 (2010)
19. Illés, T., Peng, J., Roos, C., Terlaky, T.: A strongly polynomial rounding procedure yielding a maximally complementary solution for $P_*(k)$ linear complementarity problems. SIAM J. Optim. **11**, 320–340 (2000)
20. Illés, T., Terlaky, T.: Pivot versus interior point methods: Pros and cons. Eur. J. Oper. Res. **140**, 170–190 (2002)
21. Karmarkar, N.K.: A new polynomial-time algorithm for linear programming. Combinatorica **4**, 373–395 (1984)
22. Klafszky, E., Terlaky, T.: Some generalizations of the criss-cross method for quadratic programming. Optimization **24**, 127–139 (1992)
23. Mohammadisiahroudi, M., Augustino, B., Sampourmahani, P., Terlaky, T.: Quantum computing inspired iterative refinement for semidefinite optimization. Math. Program. (2025). https://doi.org/10.1007/s10107-024-02183-zarXiv:2312.11253 (2023)
24. Mohammadisiahroudi, M., Wu, Z., Augustino, B., Carr, A., Terlaky, T.: Improvements to quantum interior point method for linear optimization. ACM Trans. Quant. Comput. **6**, 8 (2025)
25. Nematollahi, E., Terlaky, T.: A redundant Klee-Minty construction with all the redundant constraints touching the feasible region. Oper. Res. Lett. **36**, 414–418 (2008)
26. Nematollahi, E., Terlaky, T.: A simpler and tighter redundant Klee-Minty construction. Optim. Lett. **2**, 403–414 (2008)
27. Peng, J., Roos, C., Terlaky, T.: Self-Regular Functions: a New Paradigm for Primal-Dual Interior-Point Methods. Princeton University Press, Princeton, NJ (2002)
28. Pólik, I., Terlaky, T.: A survey of the s-lemma. SIAM Rev. **49**, 371–418 (2007)
29. Quist, A.J., van Geemert, R., Hoogenboom, J.E., Illés, T., Roos, C., Terlaky, T.: Application of nonlinear optimization to reactor core fuel reloading. Ann. Nuclear Energy **26**, 423–448 (1999)
30. Roos, C., Terlaky, T., Vial, J.-Ph.: Theory and Algorithms for Linear Optimization. An Interior Approach. John Wiley & Sons, Chichester, UK (1997)
31. Roos, C., Terlaky, T., Vial, J.-Ph.: Interior Point Methods for Linear Optimization. Springer, New York, NY (2005)
32. Shahabsafa, M., Fakhimi, R., Lei, W., He, S., Martins, J.R.R.A., Terlaky, T., Zuluaga, L.F.: Truss topology design and sizing optimization with guaranteed kinematic stability. Struct. Multidisc. Optim. **63**, 21–38 (2021)
33. Shahabsafa, M., Terlaky, T., Gudapati, N.V.C., Sharma, A., Wilson, G.R., Plebani, L.J., Bucklen, K.B.: The inmate assignment and scheduling problem and its application in the Pennsylvania department of corrections. Interfaces **48**, 467–483 (2018)
34. Terlaky, T.: A convergent criss-cross method. Optimization **16**, 683–690 (1985)
35. Terlaky, T.: On l_p programming. Eur. J. Oper. Res. **22**, 70–100 (1985)
36. Terlaky, T.: Egy véges criss-cross módszer és alkalmazásai. MTA SZTAKI Tanulmányok, **179**. MTA SZTAKI, Budapest, Hungary (1986)
37. Terlaky, T.: A finite crisscross method for oriented matroids. J. Comb. Theory, Ser. B **42**, 319–327 (1987)
38. Terlaky, T.: An easy way to teach interior-point methods. Eur. J. Oper. Res. **130**, 1–19 (2001)
39. Terlaky, T., Vannelli, A., Zhang, H.: On routing in VLSI design and communication networks. Discrete Appl. Math. **156**, 2178–2194 (2008)
40. Wu, Z., Mohammadisiahroudi, M., Augustino, B., Yang, X., Terlaky, T.: An inexact feasible quantum interior point method for linearly constrained quadratic optimization. Entropy **25**, 330 (2023)
41. Yang, D., Peng, J., Lu, M., Terlaky, T.: Optimal nearly analytic discrete approximation to the scalar wave equation. Bull. Seismol. Soc. Amer. **96**, 1114–1130 (2006)
42. Zionts, S.: The criss-cross method for solving linear programming problems. Manag. Sci. **15**, 426–445 (1969)