

Inner Rectangular Drawings of Plane Graphs: Application of Graph Drawing to VLSI Layouts

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Abstract. A drawing of a plane graph is called an inner rectangular drawing if every edge is drawn as a horizontal or vertical line segment so that every inner face is a rectangle. An inner rectangular drawing has some applications to VLSI layouts. In this talk we show that a plane graph G has an inner rectangular drawing D if and only if a new bipartite graph constructed from G has a perfect matching. We also show that D can be found in time $O(n^{1.5}/\log n)$ if G has n vertices and a sketch of the outer face is prescribed, that is, all the convex outer vertices and concave ones are prescribed. This is a joint work with K. Miura and H. Haga.

Biography of Takao Nishizeki

Professor Takao Nishizeki, currently Vice Dean and Professor of algorithm theory in the Graduate School of Information Sciences, Tohoku University in Japan, was born in Fukushima, northeastern part of Japan, in 1947. He received the B. E., M. E. and D. E. degrees in electrical communication engineering from Tohoku University, one of the most prominent universities in Japan, in 1969, 1971 and 1974, respectively. Upon graduation, he joined the faculty at Tohoku University, where in 1988 he was appointed to the current professorship.

Professor Nishizeki has established himself, both nationally and internationally, as a world leader in the computer science, in particular, algorithms for planar graphs, edge-coloring, network flows, VLSI routing, graph drawing and cryptology. His publication list includes three co-authored books, five edited books and more than two hundred technical papers in leading journals and prestigious conferences such as *JACM*, *Algorithmica*, *Journal of Algorithms*, *STOC*, *ICALP*, and *SODA*. The quality of his work is best illustrated by the fact that a number of his papers have been selected as best papers and have also been invited to special journal issues. One of his co-authored books, “Planar Graph Drawing” published in 2004, was written with a promising computer scientist of Bangladesh, Dr. Md. Saidur Rahman who received Master of Information Sciences and Ph. D. degrees under Professor Nishizeki’s supervision and is now a professor of BUET. The book is considered as the most valuable pioneering work of planar graph drawings, and it has been widely distributed over the world.

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As the most active and renowned computer scientist in Asia, Professor Nishizeki has also made a great contribution to build a community of computer science researchers in the Asia and Pacific region. In 1990 he founded the first International Symposium on Algorithms and Computation (ISAAC) for the purpose of expanding the research community among the Asian and Pacific countries, which has been being held in Asia-Pacific region annually since then. Thanks to this conference, the computer science in Asia has successfully flourished. ISAAC is no doubt a landmark in the Asian society of computer science. Besides this attempt, Dr. Nishizeki has also made continuous efforts at supervising research students from all over the world. Most of them have remained academics in research universities and they are active as leading researchers in their own countries.

Professor Nishizeki is a Fellow of many distinguished academic and scientific societies including ACM, IEEE, IEICE of Japan, Information Processing Society of Japan and a foreign fellow of Bangladesh Academy of Sciences. He has been serving as Advisory Committee Chair of ISAAC since 1990, and acting as Steering Committee member of Graph Drawing conference since 1993. Dr. Nishizeki has also kept himself busy as editors of prestigious journals. He is currently serving *Algorithmica*, *Journal of Combinatorial Optimization*, and *Journal of Graph Algorithms and Applications* as advisory editorial board member. He also served as editors of Discrete Mathematics and Theoretical Computer Science (1997–2006), Journal of Information Processing (1988–1994), Transaction of IEICEJ (1989–1991) and Journal of IEICEJ (1983–1986).

Professor Nishizeki has been actively associated with world leading researchers, constantly invited by major universities over the world. Among them are Carnegie Mellon University and UC Berkeley in the United States, Waterloo University and Simon-Fraser University in Canada, Bonn University and TU Berlin in Germany, Taiwan National University and Academia Sinica in Taiwan. He was also a Visiting Research Mathematician at Carnegie-Mellon University from 1977 to 1978.

For his great achievements in computer science, Professor Nishizeki is awarded ICF Best Research Award by International Communications Foundation in 2006. In 2003 Funai Information Science Promotion Award was presented to him by Funai Foundation for Information Technology, and in 1998 TELECOM Technology Award by The Telecommunications Advancement Foundation.