

## New Advances in 2-D (Two-Dimensional) Filter Design

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**Abstract:** New design methodology for 2-D and 3-D (two-dimensional and three dimensional) Comb Filters and 2-D Fan Filters as well as for three-dimensional (3-D) Cone Filters are presented. The methodologies are based on appropriate transformations and do not require the solution of an optimization problem. Numerical examples illustrate the validity and the efficiency of the method. Comb filters are the filter that delay a signal and adds it to itself, causing signal assembly and disassembly interference. 2-D and 3-D comb filters have been introduced recently in PAL and NTSC television decoders. Fan filters (2-D) and cone filters (3-D) are used in several areas of seismic data processing, geophones applications, biomedical imaging, elective filtering of broadband 2-D plane waves and so on. Several methods have been already proposed for the design, stability checking and implementation of fan and cone filters.

**Brief Biography** of the Speaker: Prof. Dr. Nikos E. Mastorakis received his B.Sc. and M.Sc. (Diploma) in Electrical Engineering from the National Technical University of Athens (Greece) and the Ph.D. in Electrical Engineering and Computer Science from the same university. He also received the B.Sc. (Ptychion) in Pure Mathematics from the National University of Athens, Greece. He also studied Medicine in Medical School of Athens of the same university. He have served as special scientist on Computers and Electronics in the Hellenic (Greek) Army General Staff (1993-1994) and taught several courses in the Electrical and Computer Engineering Department of the National Technical University of Athens (1998-1994). He has also served as Visiting Professor at the University of Exeter, School of Engineering (UK, 1998), Visiting Professor in the Technical University of Sofia (Bulgaria, 2003-2004) while he is now Professor in the Technical University of Sofia (Bulgaria, <http://elfe.tu-sofia.bg/elfe/staff.htm>, <http://elfe.tu-sofia.bg/elfe/curriculum4.htm> and <http://elfe.tu-sofia.bg/elfe/curriculum3.htm> and also Professor in the department of Computer Science at the Military Institutions of University Education (MIUE) -Hellenic Naval Academy, Greece. Prof. Dr. Nikos Mastorakis was the first that solved with several different approaches the former unsolved problem of Multivariable Factorization and published it. He was also the first scholar that completely solved the problem of stability for Multidimensional Systems using Genetic Algorithms. Also, was the first that constructed Electronic Musical Instrument with the spaces of the Byzantine music. He is an active researcher in Applied Mathematics and Computer Science (Systems Theory, Control, Optimization Theory, Algorithms Theory, Signal Processing, Robotics, Computational Intelligence). The editor of over than 200 Books and the author of 5 books, Dr. Mastorakis has published more than 600 papers (see below) in international books, journals and conferences. An active reviewer of 26 International Journals and member of the Editorial Board of 13 International Journals and Editor of International Book Series: (Editor of the series "Electrical and Computer Engineering" (WSEAS Press) and Editor of the series "Mathematics and Computers in Science and Engineering" (WSEAS-Press), Member of the Editorial Board of "Advances in Computation: Theory and Practice" by NOVA), Dr. Mastorakis has received several awards (Royal Society of England, Hellenic National Research Foundation, etc) for his academic studies and his scientific research.

Prof. Dr. Nikos Mastorakis is the Editor-in-Chief in many International Journals. He was the General Chairman in more than 30 International Conferences. He has organized more than 40 Special Sessions, 3 Workshops and has given many plenary lectures. He is also member of IEEE (Senior Member), New York Academy of Sciences, of A.F.

Communications and Electronics Association, American Association for the Advancement of Science and other smaller scientific societies.

Dr. Mastorakis is a registered professional electrical and mechanical engineer. He is also Honorary Professor, University of Cluj, ROMANIA <http://outstanding.wseas.us> He has received the Prize of Excellence from Romanian Academy of Science, Bucharest, ROMANIA <http://outstanding.wseas.us> and he is also Professor at the ASEI (Military Institutes of University Education), Hellenic Naval Academy, GREECE since 1994 <http://www.hna.gr>