The evolution of waveform relaxation for circuit and electromagnetic solvers.

Dr. Albert E. Ruehli
IBM T. J. Watson Research Center, Yorktown Heights, NY.

Waveform relaxation is a time domain iterative decomposition type technique for the solution of large systems. The approach has been developed for circuit and recently also electromagnetic problems. In this presentation we give some fundamental concepts of waveform relaxation and its application. The approach is best suited for parallel processing since a problem is divided into many sub-systems. We use the partial element equivalent circuit approach for the solution of electromagnetic problems since it is a suitable circuit representation of Maxwell's equations for waveform relaxation.

Albert Ruehli received the Ph.D. degree in electrical engineering in 1972 from the University of Vermont, Burlington. He has been a member of various projects with IBM including mathematical analysis, semiconductor circuits and devices modeling, and as manager of a VLSI design and CAD group. Since 1972, he has been at the IBM T.J. Watson Research Center, Yorktown Heights, NY. He is the editor of two books, Circuit Analysis, Simulation and Design (New York, North Holland 1986,1987) and he is an author or coauthor of over 150 technical papers.
He has given talks at universities including keynote addresses and tutorials at conferences, and has organized many sessions. He has received IBM Research Division or IBM Outstanding Contribution Awards in 1975, 1978 1982, 1995 and 2000. In 1982, he has received the Guillemin-Cauer Prize Award for his work on waveform relaxation, and in 1999, he has received a Golden Jubilee Medal, both from the IEEE CAS Society. In 2001, he has received a Certificate of Achievement from the IEEE EMC society for inductance concepts and the Partial Element Equivalent Circuit(PEEC) method. He is a life fellow of the IEEE and a member of SIAM.