Foreword

Discrete applied problems, cellular automata and lattices: florilegium for E. Goles

The present volume brings together 11 oral contributions on discrete applied problems, cellular automata and lattices presented for the 50th birthday of E. Goles (Santiago de Chile, August 2001). These oral contributions have been after prepared in written form and reviewed by external referees as regular papers for Theoretical Computer Science during the year 2002.

The essential of the volume (six papers) is devoted to applications of discrete mathematics to genomics and proteomics, and to modelling of university admission, animation and paper folding. The rest of the volume (five papers) concerns cellular automata and lattices.

After a Preface by M. Nivat, who emphasizes both the creative and organizational roles of E. Goles in the scientific research, a first section proposes six papers on discrete applied problems. J. Aracena et al. contribute to studying attractors of the iteration dynamics for monotone functions having symmetric connection graph, with potential applications in genetic control modelling. After, M. Băişou and M. Balinski study the dual problem of the optimal decision for students admission by universities and of the best choice for students voting in favour of these universities. The third paper by A. Gajardo and E. Goles is devoted to the Langton’s ant whose complex motion is studied in one dimension. The following article is an introduction to paper folding a new field explored by E. Goles. The next contribution is done by A. Moreira and it describes the use of genetic algorithm for solving the back translation problem from proteins to genes. The last paper of this section of applications is written by G. Weil et al. with a special focus on non-degenerate cyclic codes from which the present genetic code could derive.

The second section presents theoretical results on cellular automata and lattices. The first paper by M. Delorme and J. Mazoyer describes an application of a cellular automaton on which is added a one-to-one “locally connected” mapping named a thread, the system leading to a notion of language (usual language of words) recognition depending on this thread. The second article proposed by C. Durr et al. studies the relationship between local rules and global behaviours of cellular automata by using tools from the complexity theory. The next article by M. Matamala and E. Moreno is devoted to the dynamics of cyclic automata over $\mathbb{Z}^2$ which generalize the voting model. The following paper by E. Goles et al. deals with the sandpile models and their relationships with lattices structures. Finally, the ultimate paper of the volume
by E. Remila is a study about lattices focusing on the domino tilings of a polygon problem.

The present set of contributions is well representative of the eclectism Eric Goles shows in his own choices of new research fields and offers to the young community of his students numerous new ways of both theoretical and applied investigations in the “marvelous garden” of the discrete mathematics and their applications.

Eric has shown to many of us his mathematics and also his country, in particular, during memorable week ends at Isla Negra (happy days, happy years, etc.), near the house of Pablo Neruda. Because 2003 is the centennial year of Pablo Neruda and the 50th anniversary of the DNA, we offer to Eric these first flowers of our Florilegium, a free French version of a captain’s song by Pablo Neruda.

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