

DOCUMENTA MATHEMATICA
EXTRA VOLUME: OPTIMIZATION STORIES, 2012

PREFACE	1
INTRODUCTION	3
STORIES ABOUT THE OLD MASTERS OF OPTIMIZATION	7
YA-XIANG YUAN JIU ZHANG SUAN SHU AND THE GAUSS ALGORITHM FOR LINEAR EQUATIONS	9–14
EBERHARD KNOBLOCH LEIBNIZ AND THE BRACHISTOCHRONE	15–18
EBERHARD KNOBLOCH LEIBNIZ AND THE INFINITE	19–23
PETER DEUFLHARD A SHORT HISTORY OF NEWTON’S METHOD	25–30
EBERHARD KNOBLOCH EULER AND INFINITE SPEED	31–35
EBERHARD KNOBLOCH EULER AND VARIATIONS	37–42
MARTIN GRÖTSCHEL AND YA-XIANG YUAN EULER, MEI-KO KWAN, KÖNIGSBERG, AND A CHINESE POSTMAN	43–50
LINEAR PROGRAMMING STORIES	51
DAVID SHANNO WHO INVENTED THE INTERIOR-POINT METHOD?	55–64
GEORGE L. NEMHAUSER COLUMN GENERATION FOR LINEAR AND INTEGER PROGRAMMING	65–73
GÜNTER M. ZIEGLER WHO SOLVED THE HIRSCH CONJECTURE?	75–85
FRIEDRICH EISENBRAND POPE GREGORY, THE CALENDAR, AND CONTINUED FRACTIONS	87–93

MARTIN HENK LÖWNER–JOHN ELLIPSOIDS	95–106
ROBERT E. BIXBY A BRIEF HISTORY OF LINEAR AND MIXED-INTEGER PROGRAMMING COMPUTATION	107–121
DISCRETE OPTIMIZATION STORIES	123
JAROSLAV NEŠETŘIL AND HELENA NEŠETŘILOVÁ THE ORIGINS OF MINIMAL SPANNING TREE ALGORITHMS – BORŮVKA AND JARNÍK	127–141
WILLIAM H. CUNNINGHAM THE COMING OF THE MATROIDS	143–153
ALEXANDER SCHRIJVER ON THE HISTORY OF THE SHORTEST PATH PROBLEM	155–167
ALEXANDER SCHRIJVER ON THE HISTORY OF THE TRANSPORTATION AND MAXIMUM FLOW PROBLEMS	169–180
WILLIAM R. PULLEYBLANK EDMONDS, MATCHING AND THE BIRTH OF POLYHEDRAL COMBINATORICS	181–197
THOMAS L. GERTZEN AND MARTIN GRÖTSCHEL FLINDERS PETRIE, THE TRAVELLING SALESMAN PROBLEM, AND THE BEGINNING OF MATHEMATICAL MODELING IN ARCHAEOLOGY	199–210
ROLF H. MÖHRING D. RAY FULKERSON AND PROJECT SCHEDULING	211–219
GÉRARD CORNUÉJOLS THE ONGOING STORY OF GOMORY CUTS	221–226
WILLIAM COOK MARKOWITZ AND MANNE + EASTMAN + LAND AND DOIG = BRANCH AND BOUND	227–238
SUSANNE ALBERS RONALD GRAHAM: LAYING THE FOUNDATIONS OF ONLINE OPTIMIZATION	239–245
CONTINUOUS OPTIMIZATION STORIES	247
CLAUDE LEMARÉCHAL CAUCHY AND THE GRADIENT METHOD	251–254

RICHARD W. COTTLE WILLIAM KARUSH AND THE KKT THEOREM	255–269
MARGARET H. WRIGHT NELDER, MEAD, AND THE OTHER SIMPLEX METHOD	271–276
JEAN-LOUIS GOFFIN SUBGRADIENT OPTIMIZATION IN NONSMOOTH OPTIMIZATION (INCLUDING THE SOVIET REVOLUTION)	277–290
ROBERT MIFFLIN AND CLAUDIA SAGASTIZÁBAL A SCIENCE FICTION STORY IN NONSMOOTH OPTIMIZATION ORIGINATING AT IIASA	291–300
ANDREAS GRIEWANK BROYDEN UPDATING, THE GOOD AND THE BAD!	301–315
HANS JOSEF PESCH CARATHÉODORY ON THE ROAD TO THE MAXIMUM PRINCIPLE	317–329
HANS JOSEF PESCH AND MICHAEL PLAIL THE COLD WAR AND THE MAXIMUM PRINCIPLE OF OPTIMAL CONTROL	331–343
HANS JOSEF PESCH THE PRINCESS AND INFINITE-DIMENSIONAL OPTIMIZATION	345–356
COMPUTING STORIES	357
DAVID S. JOHNSON A BRIEF HISTORY OF NP-COMPLETENESS, 1954–2012	359–376
ROBERT FOURER ON THE EVOLUTION OF OPTIMIZATION MODELING SYSTEMS	377–388
ANDREAS GRIEWANK WHO INVENTED THE REVERSE MODE OF DIFFERENTIATION?	389–400
RAÚL ROJAS GORDON MOORE AND HIS LAW: NUMERICAL METHODS TO THE RESCUE	401–415
THOMAS M. LIEBLING AND LIONEL POURNIN VORONOI DIAGRAMS AND DELAUNAY TRIANGULATIONS: UBIQUITOUS SIAMESE TWINS	417–429
MORE OPTIMIZATION STORIES	431
KONRAD SCHMÜDGEN AROUND HILBERT’S 17TH PROBLEM	433–438
MICHAEL JOSWIG FROM KEPLER TO HALES, AND BACK TO HILBERT	439–446

MATTHIAS EHRGOTT	
VILFREDO PARETO AND MULTI-OBJECTIVE OPTIMIZATION	447–453
WALTER SCHACHERMAYER	
OPTIMISATION AND UTILITY FUNCTIONS	455–460