

LIST OF PUBLICATIONS WITH A COMMENTARY

BOOKS

- [1] Boolesche Algebra und Anwendungen. Österr.Bundesverlag, Wien (1975).
- Gem.mit H.Bürger und W.Nöbauer
- [2] Lineare Optimierung und Anwendungen. Österr.Bundesverlag,Wien
(1977). - Gem.mit W.Nöbauer und W. Timischl
- [3] Mathematische Grundlagen für Chemiker I. Prugg-Verlag, Wien-Eisenstadt
(1977). - Gem.mit H.Kaiser
- [4] Mathematische Grundlagen für Chemiker II. Prugg-Verlag, Eisenstadt
(1981). - Gem.mit G.Eigenthaler und H.Kaiser
- [5] Mathematische Grundlagen für Chemiker III-Aufgabensammlung. Prugg-
Verlag, Eisenstadt (1983). - Gem.mit G.Eigenthaler und G.Hasibeder
- [6] Allgemeine Algebra und Anwendungen. Teubner-Verlag, Stuttgart (1984).
- Gem.mit W.Müller
- [7] Mathematik für Wirtschaftsinformatiker - Grundlagen, Modelle,
Programme, Bd.I. Springer-Verlag Wien (1988, 2.Aufl. 1996). - Gem.mit
G.Karigl
- [8] Mathematik für Wirtschaftsinformatiker - Grundlagen, Modelle,
Programme, Bd.II. Springer-Verlag Wien (1988, 2.Aufl. 1999). - Gem.mit
G.Karigl

PAPERS

- [9] Zusammenhang zwischen kubischen und biquadratischen endlichen
Graphen (Teil I). Sb.Österr.Akad.Wiss.Math.-naturw.Kl.178 (1969), 359-
378
- [10] Zusammenhang zwischen kubischen und biquadratischen endlichen
Graphen (Teil II). Sb.Österr.Akad.Wiss.Math.-naturw.Kl.179 (1970), 215-
232
- [11] Kreiszerlegungen 4-regulärer Graphen und das Vierfarbenproblem.
Arch.der Math. 23 (1972), 214-218
- [12] Über Eulersche und paare Hamiltonsche Graphen. Czech.Math.J. 22
(1972), 600-611
- [13] Überdeckung der Ebene durch inkongruente Kreise. Elem.der Math. 28
(1973),105-107

- [14] Über die Wortlänge von Polynomfunktionen auf Verbänden. Monatsh.Math. 77 (1973), 97-104
- [15] Über den Grad von Polynomfunktionen auf Verbänden. Abh.Math. Sem.Univ.Hamburg 42 (1974),147-153. -Gem.mit J.Wiesenbauer
- [16] Modulare Polynomverbände über endlichen distributiven Verbänden. Monatsh.Math. 78 (1974), 305-310
- [17] Über die Anzahl von Polynomen und Polynomfunktionen auf endlichen Verbänden. J.reine angew.Math. 273 (1975),199-205.
- [18] Ein Test für die Hochschulreife aus Mathematik. DdM 3 (1975), Heft 1,72-79. -Gem.mit H.Kaiser
- [19] Polynomials and polynomial functions on lattices. Proceed. Lattice Theory Conf.Ulm (1975), 48-53
- [20] Ein Distributivitätskriterium für Verbände. Monatsh.Math. 81 (1976), 1-3.
- [21] Anzahlsätze für Polynomfunktionen auf Verbänden. Rend.Inst. di Matem.Univ.Trieste 8 (1976), 135-141. -Gem.mit J.Wiesenbauer
- [22] Optimierungsaufgaben im Mathematikunterricht an höheren Schulen. In: Anwendungs-orientierte Mathematik in der Sekundarstufe II. Verlag J.Heyn, Klagenfurt (1977), 59-66
- [23] Fortbildungsseminare als Möglichkeit zur Weiterbildung der Mathematiklehrer. DdM 6 (1978),Heft 1, 65-69.- Gem.mit W.Nöbauer
- [24] Local polynomial functions on distributive lattices. An.Acad. brasil.Cienc. 50(4) (1978), 433-437
- [25] Auswertung eines Tests für die Hochschulreife aus Mathematik. DdM 6 (1978), Heft 1, 74-82. - Gem.mit H.Kaiser und W.Wertz.
- [26] Verbandsstrukturen im Mathematikunterricht. Didaktik-Reihe der Österr.Math.Ges.,Heft 4 (1979),38-49
- [27] Über den kanonischen Homomorphismus von Polynomverbänden.Sb. Österr. Akad. Wiss. Math.-naturw.Kl. 188 (1979), 179-187. - Gem.mit G.Eigenthaler
- [28] Zur Darstellung von Polynomen auf De Morgan Algebren. Czech. Math.J. 30 (1980), 65-70. - Gem.mit D.Schweigert
- [29] Local polynomial functions on lattices and universal algebras. Coll.Math. 42 (1980), 83-93.- Gem.mit W.Nöbauer
- [30] A note on local polynomial functions over lattices. Algebra Universalis 11 (1980), 135-138
- [31] On generating sets of order-preserving functions over finite lattices. Coll. Math. Soc. J. Bolyai 33 (1980) 317-324

- [32] Von der Booleschen Algebra zur Quantenmechanik. *Wiss.Nachr.* 57 (1981), 31-32
- [33] On compatible and order-preserving functions on lattices. *Banach Center Publ.* 9 (1982), 97-104. - Gem.mit G.Eigenthaler
- [34] An explicit formula for the solution of the Fisher-Wright selection model in population genetics. *Discrete Appl.Math.* 6 (1983), 209-212. - Gem.mit H.Länger
- [35] Zur Darstellung von Observablen auf σ -stetigen Quantenlogiken. *Sb. Österr. Akad. Wiss. Math.-naturwiss. Kl.* 192 (1983), 169-176. - Gem. mit H.Länger und M.Maczynski
- [36] A formula for the solution of the difference equation $x_{n+1} = ax_n^2 + bx_n + c$. *Acta Sci.Math.* 47 (1984), 487-489. - Gem.mit H.Länger
- [37] Lattice operations between observables in axiomatic quantum mechanics. *Int.J.of Theoret.Phys.* 24, Nr.10 (1985),1069-1073
- [38] A discrete analogue of Kendall's Pandemic Threshold Theorem. *Sb. Österr. Akad. Wiss. Math.-naturwiss.Kl.* 195 (1986), 319-324. - Gem.mit W.Timischi
- [39] Geometrical constraints on Bennett's predictions of chromosome order. *Heredity* 58 (1987), 321-325. - Gem.mit W.Timischi
- [40] On permutations of chromosomes. *Contr.to Gen.Alg.* 5 (1987), 95-103
- [41] Mathematikausbildung von Wirtschaftsinformatikern. In: *Wirtschaftsmathematik in Beruf und Ausbildung*, Verlag Hölder, Pichler, Tempsky, Wien (1987), 53-60
- [42] Polygons of shortest perimeter reconstructing chromosomal order. *Sb. Österr. Akad. Wiss. Math.-naturwiss. Kl.* 196 (1987), 419-433. - Gem.mit G.Hasibeder
- [43] On a set of relations arising from the triangulation problem. *Studia Sci.Math.Hungar.* 23 (1988), 289-294. - Gem.mit H.Länger
- [44] Anwendungen der Mathematik in Chemie und Biologie. *Math. Didakt. Koll.d.Kepler Universität Linz* (Hsg.P.O.Runck u.W.Schlöglmann), Heft 18 (1988),31-66
- [45] Reconstruction of deformed regular polygons: a problem arising from cell-biology. *Demonstratio Math.* 21 (1988), 559-568. - Gem.mit G.Hasibeder
- [46] Netzplantechnik im Mathematikunterricht. *Didaktik-Reihe der Österr.Math.Ges.*, Heft 17 (1989), 21-34
- [47] Dynamische Systeme im Mathematikunterricht. *Didaktik-Reihe der Österr.Math.Ges.*, Heft 18 (1990), 21-39

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- [49] Algebraic analysis of chromosome order. Demonstratio Math. 26(1993), 237-248
- [50] Hamiltonian circuits determining the order of chromosomes. Discrete Appl.Math., 50 (1994), 159-168
- [51] Reconstructing the spatial order of chromosomes by a convex hull algorithm. Demonstratio Math. 27 (1994), 829-841
- [52] Simulation of Chromosomal Homology Searching in Meiotic Pairing. J.theor.Biol. 176 (1995), 247-260. - Gem. mit G.Karigl und J.Loidl
- [53] Perspektiven einer praxisbezogenen Ausbildung aus Algebra. In: Schriftenreihe Didaktik der Mathematik, Bd.23, Verlag Hölder-Pichler-Tempsky, Wien (1996), 91-98
- [54] Simulation of Chromosome Interlocking in Meiotic Pairing. In Proc.EUROSIM 95, Isevier Science B.V.,Amsterdam (1995), 969-974. - Gem.mit G.Karigl und J.Loidl
- [55] Algebraische Codierungstheorie und Compact Discs. Elem.d.Math.51 (1996), 89-101
- [56] Algorithms for Reconstructing the Spatial Order of Chromosomes. ZAMM 76(1996)S2, 521-522.
- [57] A Cellular Automaton Model for Chromosome Interlocking in Meiotic Pairing. In: Simulation Practice and Theory, Vol.6 (No 3) (1998), 269-280. - Gem.mit G.Karigl und J.Loidl
- [58] The logic induced by a system of homomorphisms and its various algebraic characterizations. Demonstratio.Math. 30 (1997), 215-232. - Gem.mit H.Länger und M.Maczyński
- [59] Sublogics of ring-like quantum logics. Tatra Mt.Math.Publ. 15 (1998), 75-83
- [60] On ring-like structures occurring in axiomatic quantum-mechanics. Österr.Akad.Wiss. Math.-naturw.Kl..Abt.II, 206 (1997), 279-289 - Gem.mit H.Länger und M.Maczyński
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- [62] On ring-like structures induced by Mackey's probability function. Rep.Math.Phys.43 (1999), 499-515. - Gem mit H.Länger und M.Maczyński
- [63] Lattice properties of ring-like quantum logics. Int.J.of Theoret.Phys.39, Nr.10 (2000), 1015-1026. – Gem. mit H.Länger und M.Maczyński

- [64] Concepts of measures on ring-like quantum logics. Rep.Math.Phys 47 (2001), 167-176. - Gem. mit H.Länger und M.Maczyński
- [65] On Hamiltonian graphs arising from spatial orders of chromosomes of even number. Demonstratio Math. 34(2001), 733-742. - Gem.mit B.Hueber
- [66] Ring-like structures with unique symmetric difference related to quantum logic. Discussiones Math.-General Algebra Appl. 21(2001), 239-253 - Gem. mit H.Länger und M.Maczyński
- [67] A simple quantum mechanical model for deriving the energy function of n-component systems. MATCOM 66(2004) 173-179. – Gem. mit M.Maczyński
- [68] On characteristic polynomials of molecular graphs with heteroatoms. Int.J.Pure Appl. Math. 5, No3(2003), 301-314. - Gem. mit H.Länger
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- [70] On characteristic polynomials of weighted molecular graphs. Int.J.Pure Appl. Math. 12, No1(2004), 33-47. – Gem. mit H.Länger
- [71] On ring-like structures related to symmetric cryptosystems. Demonstratio.Math.38(2005), 265-276. - Gem.mit H.Länger und M.Maczyński
- [72] Polynomial permutations on finite lattices related to cryptography. Int.J.Pure Appl. Math. 40, No3(2007), 441-449 - Gem. mit H.Länger
- [73] Term extensions of partial ring-like quantum logics. Int.J.Contemp.Math. Sciences 2 (2007), no. 21, 999 – 1008. – Gem. mit H.Länger
- [74] On a cryptographical characterization of classical and nonclassical event systems. Rep. Math. Phys. 60(2007), 117-123 - Gem. Mit E. Beltrametti, und M. Maczyński
- [75] On characteristic polynomials of vertex-and edge-weighted molecular graphs. PAMM Proc. Appl. Math. Mech. 7, (2007), 20700003–20700004
- [76] On a characterization of physical systems by spaces of numerical events. ARGESIM Report 35 (2009), 601-607 – Gem. mit H.Länger
- [77] On algebras of multidimensional probabilities. Math. Slovaca 60, (2010) 571-582. DOI: 10.2478/s12175-010-0032-8 - Gem. mit G.Dorfer und H. Länger
- [78] On the structure of numerical event spaces. Kybernetika.45 (2010), 971-981 - Gem. mit G.Dorfer und H.Länger
- [79] On the structure of generalized fields of events. – Contr. to General Algebra 20 (2012), 29-34

- [80] Testing for classicality of a physical system. *Int. J. Theor. Phys.*, 52(4) (2013) 1141-1147. DOI 10.1007/s10773-012-1429-7 - Gem. mit H. Länger
- [81] A Note on Boolean subsets. *Italian J.PureAppl.Math.*, 32(2014) 277-282. – Gem. mit H.Länger.
- [82] Probability measurements characterizing the classicality of a physical system. *Rep.Math.Phys.*, 73(2014) 127-135. – Gem. mit H. Länger
- [83] On bounded posets arising from quantum mechanical measurements. *Int. J. Theor. Phys.* 55 (2016), 4453-4461. DOI 10.1007/s10773-016-3068-x. – Gem mit H.Länger
- [84] Thinnest Covering of the Euklidean Plane with Incongruent Circles. *Anal.Gem.Metr.Spaces* 5 (2017), 40-46. DOI 10.1515/agms-2017-0002.
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- [86] Quantum measurements generating structures of numerical events. *J.Appl.Math.Phys.*, 6(2018), 982 - 996. – Gem. mit H.Länger
- [87] Quantum logics defined by sets of numerical events. *Rep.Mat.Phys.* 83 (2019), 243-251. DOI: 10.1016/S0034-4877(19)30041-2. – Gem.mit H. Länger
- [88] On a conjecture of L. Fejes Tóth and J. Molnár about circle coverings of the plane. *Period. Math. Hung.* 78 (2019),242-253. DOI: 10.1007/s10998-018-0254-z
- [89] Quantenlogiken und Numerische Ereignisse. *IMN*, 240 (2019), 1-11
- [90] Identifying quantum logics by numerical events. *Math. Slovaca* 70 (2020), 41–50. DOI: 10.1515/ms-2017-0329
- [91] Boolean properties and Bell-like inequalities of numerical events. *Rep.Mat.Phys.* 85 (2020), 147-162. - Gem.mit H.Länger und M.Macynski
- [92] On ring-like structures of lattice-ordered numerical events. *Asian-European J. Math.* 14 (2021), 2150186-1 - 2150186-10. DOI: 10.1142/S1793557121501862 – Gem. mit H.Länger
- [93] On Boolean posets of numerical events. *Adv. in Comp. Int.* **1**, 4 (2021). DOI: 10.1007/s43674-021-00004-w. – Gem. mit H.Länger
- [94] On ring-like event systems in quantum logic. *Asian-European J. Math.* 16 (2023), 2350148-1 - 2350148-15. DOI: 10.1142/S1793557123501486 - Gem. mit H. Länger
- [95] Critical elements in algebras of numerical events. *Asian-European J. Math.* (2026), 2650013 (12 pp.). DOI 10.1142/S1793557126500130. – Gem. mit H.Länger
- [96] On orthoposets of numerical events in quantum logic. *Rep.Math.Phys* – to appear. – Gem. mit H. Länger

EDITOR OF PROCEEDINGS AND OTHER COLLECTIONS

- [97] Contributions to General Algebra 6. Hölder-Pichler-Tempsky, Wien und Teubner-Verlag, Stuttgart (1988). -Gem.mit G.Eigenthaler, H.K.Kaiser und W.B.Müller.
- [98] Contributions to General Algebra 7. Hölder-Pichler-Tempsky, Wien und Teubner-Verlag, Stuttgart (1991). -Gem.mit G.Eigenthaler, H.K.Kaiser und W.B.Müller.
- [99] Contributions to General Algebra 10. Verlag J.Heyn, Klagenfurt (1998).- Gem mit G.Eigenthaler et. al.
- [100] Special issue on the XXX-th anniversary of Demonstratio Math.30, No4 (1997). - Gem mit A.Fryzkowski, Z.Lonc und M.Tryjarska
- [101] Contributions to General Algebra 12. Verlag J.Heyn, Klagenfurt (2000) - Gem mit G.Eigenthaler et. al.

OTHER ARTICLES

- [102] Codierung und Chiffrierung. Schriftenreihe zur Lehrerfortbildung, PIB Wien (1991)
- [103] Experiences with a computer-assisted graduate course on optimization for students of chemistry. Europ.Math.Soc. Newsletter 5 (1992),16-17.
- [104] Wird der Mathematikunterricht durch den Computer überflüssig? Math.Didaktik.Koll.d.Kepler-Univ.Linz (Hsg. P.O.Runck und W.Schlöglmann) 20 (1993), 46-49

COMMENTARY ON THE RESEARCH PAPERS

Of the scientific papers, 33 were published without any co-authors. Among the co-authors H. Länger ranks first in terms of the number of joint publications.

1. PAPERS IN DISCRETE MATHEMATICS

These include the papers [9] – [12] on regular graphs as well as publications on problems in chemistry and biology where graph-theoretic methods are widely used (see sections 3.2 and 3.3 of this commentary). Further, there are the papers on the solution of a difference equation [36], the triangulation of matrices [43] and on a conjecture of Fejes Tóth and J.Molnár concerning the thinnest covering of the plane by incongruent circles [13], [84], [86]. (The conjecture of Fejes Tóth and J.Molnár was formulated in 1958, proved in essence for the case that only two distinct kinds of circles can occur in 1961 and unsuccessfully attempted to be proved by myself as a student. Back then I postponed this problem to the years after my retirement. At that time, I actually managed to find a solution by building on the results I had achieved as a student.)

2. PAPERS IN LATTICE THEORY

The main focus is on polynomials and polynomial functions on lattices [14] – [17], [19] – [21], [24], [27] – [31], [33]. Particularly mentionable are results of [33] achieved together with G. Eigenthaler, as they have been included in one of the most authoritative books on lattice theory (G. Grätzer, Lattice Theory: Foundation, Birkhäuser 2011). – Lattice-theoretic methods are also used within papers on axiomatic quantum mechanics (see 3.1 of this commentary) and are employed for cryptographic purposes [71], [72].

3. PAPERS RELATING TO NATURAL SCIENCES

3.1 PHYSICS (Quantum Mechanics)

Research on the representation of observables [35], [37] is followed by a series of papers on quantum logic [58], [59], [60], [62] – [64], [66], [73], [74], [76] – [83], [85], [87] – [96]. In these papers ring-like quantum logics as well as various generalizations of the concept of Hilbert-logics play a key role as they allow for descriptions of several quantum mechanical effects and to distinguish between a quantum behavior and one which is characteristic for phenomena of classical physics.

3.2 BIOLOGY

Following the papers on an explicit solution of the Fisher-Wright model of population genetics [34] and on the spread of infections [38] is a series of publications on the arrangement of chromosomes during cell division [39], [40], [42], [45], [48] – [52], [54], [56], [57], [65]. In particular, it is shown that the Bennett model on the arrangement on chromosomes, then well known among cell-biologist, is mathematically inconsistent and hence most likely biologically unjustified.

3.3 CHEMISTRY (On the theory of molecular orbitals)

These papers deal with characteristic polynomials of molecular graphs with different heteroatoms (different Coulomb integrals) and unequal attractive forces between atoms (different resonance integrals) in order to determine molecular orbitals. [67] – [70], [75]. The paper [68] is somewhat more general, it deals with the energy function of an arbitrary n -component system in quantum mechanics.

4. WORKS ON THE DIDACTICS OF APPLIED MATHEMATICS

These papers are primarily aimed at explaining mathematical methods to practioners [32], [41], [44], [53], [61]) or are directed specifically at high school teachers ([22], [23], [26], [46], [47], [100], [102]). A test for the university level proficiency in mathematics is also developed and statistically analysed [18], [25].