

References

1. Aichholzer, O., Alt, H., Rote, G.: Matching shapes with a reference point. *Int. J. of Computational Geometry and Applications* 7, 349–363 (1997)
2. Apolloni, B., Pedrycz, W., Bassis, S., Malchiodi, D.: *The Puzzle of Granular Computing*. SCI. Springer (2008)
3. Atallah, M.J.: A linear time algorithm for the Hausdorff distance between convex polygons. *Information Processing Letters* 17, 207–209 (1983)
4. Atanassov, K.: Intuitionistic Fuzzy Sets. VII ITKR Session. Sofia (Deposed in Centr. Sci.-Techn. Library of Bulg. Acad. of Sci. (1697/84) (1983) (in Bulgarian)
5. Atanassov, K.: Intuitionistic fuzzy relations. In: Third Int. Symp. “Automation and Sci. Instrumentation, Proc. part II, Varna, pp. 56–57 (1984)
6. Atanassov, K.: Intuitionistic Fuzzy Sets. *Fuzzy Sets and Systems* 20, 87–96 (1986)
7. Atanassov, K.: More on intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 33, 37–46 (1989)
8. Atanassov, K.: Norms and metrics over intuitionistic fuzzy sets. *Busefal* 55, 11–20 (1993)
9. Atanassov, K.: New operations defined over the intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 61, 137–142 (1994)
10. Atanassov, K.: Operators over interval valued intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 64, 159–174 (1994)
11. Atanassov, K.: Norms and metrics over intuitionistic fuzzy logics. *Busefal* 59, 49–58 (1994b)
12. Atanassov, K.: On the geometric interpretations of the intuitionistic fuzzy logical objects. Part I. *Busefal* 60, 48–50 (1994)
13. Atanassov, K.: On the geometric interpretations of the intuitionistic fuzzy logical objects. Part II. *Busefal* 60, 51–54 (1994)
14. Atanassov, K.: On the geometric interpretations of the intuitionistic fuzzy logical objects. Part III. *Busefal* 60, 55–59 (1994)
15. Atanassov, K.: *Intuitionistic Fuzzy Sets: Theory and Applications*. Springer (1999)
16. Atanassov, K.: On intuitionistic fuzzy implication \rightarrow^ε and intuitionistic fuzzy negation \neg^ε . *Issues in Intuitionistic Fuzzy Sets and Generalized Nets* 6, 6–19 (2008)
17. Atanassov, K.: Intuitionistic fuzzy implication $\rightarrow^{\varepsilon,\eta}$ and intuitionistic fuzzy negation $\neg^{\varepsilon,\eta}$. *Developments in Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets and Related Topics* 1, 1–10 (2008)
18. Atanassov, K.: On the intuitionistic fuzzy implications and negations. Part 1. In: Cornelis, C., et al. (eds.) *35 Years of Fuzzy Set Theory - Celebratory Volume Dedicated to the Retirement of Etienne E. Kerre*, pp. 19–38. Springer, Berlin (2010)
19. Atanassov, K., Dimitrov, D.: On the negations over intuitionistic fuzzy sets. Part 1. *Annual of “Informatics” Section Union of Scientists in Bulgaria* 1, 49–58 (2008)
20. Atanassov, K., Dimitrov, D.: Intuitionistic fuzzy implications and axioms for implications. *Notes on Intuitionistic Fuzzy Sets* 16(1), 10–20 (2010), <http://ifigenia.org/wiki/issue:nifs/16/1/10-20>
21. Atanassov, K.: Cantor’s norms for intuitionistic fuzzy sets. *Issues in Intuitionistic Fuzzy Sets and Generalized Nets* 8, 36–39 (2010)
22. Atanassov, K.: *On Intuitionistic Fuzzy Sets Theory*. Springer (2012)
23. Atanassov, K., Burillo, P., Bustince, H.: On the intuitionistic fuzzy relations. *Notes on Intuitionistic Fuzzy Sets* 1(2), 87–92 (1995)
24. Atanassov, K., Gargov, G.: Interval-valued intuitionistic fuzzy sets. *Fuzzy sets and Systems* 31(3), 343–349 (1989)

25. Atanassov, K., Tasseva, V., Szmídt, E., Kacprzyk, J.: On the geometrical interpretations of the intuitionistic fuzzy sets. In: Atanassov, K., Kacprzyk, J., Krawczak, M., Szmídt, E. (eds.) *Issues in the Representation and Processing of Uncertain and Imprecise Information. Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets, and Related Topics*, pp. 11–24. EXIT, Warsaw (2005)
26. Atanassova, L.: Remarks on the cardinality of the intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 75(3), 399–400 (1995)
27. Atanassova, L., Atanassov, K.: An example for a “genuine” intuitionistic fuzzy set. In: *Third Int. Symp. “Automation and Scientific Instrumentation”*, Proc. part II, Varna, pp. 58–60 (1984)
28. Baldwin, J.F.: Combining Evidences for Evidential Reasoning. *International Journal of Intelligent Systems* 6, 569–616 (1991)
29. Baldwin, J.F.: A Calculus for mass Assignments in Evidential Reasoning. In: Fedrizzi, M., Kacprzyk, J., Yager, R.R. (eds.) *Advances in the Dempster-Shafer Theory of Evidence*, pp. 513–531. John Wiley (1992a)
30. Baldwin, J.F.: The Management of Fuzzy and Probabilistic Uncertainties for Knowledge Based Systems. In: Shapiro, S.A. (ed.) *Encyclopaedia of AI*, 2nd edn., pp. 528–537. John Wiley (1992b)
31. Baldwin, J.F.: Mass assignments and fuzzy sets for fuzzy databases. In: Yager, R. (ed.) *Advances in the Dempster-Shafer Theory of Evidence*, pp. 577–594. John Wiley (1994)
32. Baldwin, J.F., Martin, T.P.: FRIL as an Implementation Language for Fuzzy Information Systems. In: *IPMU 1996*, Granada, pp. 289–294 (1996)
33. Baldwin, J.F., Pilsworth, B.W.: Semantic Unification with Fuzzy Concepts in Fril. In: *IPMU 1990*, Paris (1990)
34. Baldwin, J.F., Coyne, M.R., Martin, T.P.: Intelligent Reasoning Using General Knowledge to Update Specific Information: A Database Approach. *Journal of Intelligent Information Systems* 4, 281–304 (1995a)
35. Baldwin, J.F., Lawry, J., Martin, T.P.: A Mass Assignment Theory of the Probability of Fuzzy Events. *ITRC Report 229*, University of Bristol, UK (1995b)
36. Baldwin, J.F., Lawry, J., Martin, T.P.: Mass assignment based induction on decision trees of words. In: *Proc. IPMU 1998*, pp. 524–531 (1998c)
37. Baldwin, J.F., Lawry, J., Martin, T.P.: The Application of generalized Fuzzy Rules to Machine Learning and Automated Knowledge Discovery. *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems* 6(5), 459–487 (1998)
38. Baldwin, J.F., Martin, T.P., Pilsworth, B.W.: *FRIL – Fuzzy and Evidential Reasoning in Artificial Intelligence*. John Wiley (1995)
39. Bhattacharya, A.: On a measure of divergence of two multinomial populations. *Sankhya* 7, 401–406 (1946)
40. Bray, J.R., Curtis, J.T.: An ordination of the upland forest communities of Southern Wisconsin. *Ecological Monographs* 27, 325–349 (1957)
41. Bronshtein, I.N., Semendiyayev, K.A., Musiol, G., Muehlig, H.: *Handbook of Mathematics*, 5th edn. Springer (2007)
42. Bujnowski, P.: Application of intuitionistic fuzzy sets for constructing decision trees for classification tasks. Ph.D. dissertation, SRI PAS, Warsaw (2013) (in Polish)
43. Bustince, H., Burillo, P.: Correlation of interval-valued intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 74, 237–244 (1995)
44. Bustince, H., Burillo, P.: Vague sets are intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 67, 403–405 (1996)
45. Bustince, H., Mohedano, V., Barrenechea, E., Pagola, M.: An algorithm for calculating the threshold of an image representing uncertainty through A-IFs. In: *IPMU 2006*, pp. 2383–2390 (2006)

46. Bustince, H., Mohedano, V., Barrenechea, E., Pagola, M.: Image thresholding using intuitionistic fuzzy sets. In: Atanassov, K., Kacprzyk, J., Krawczak, M., Szmidt, E. (eds.) *Issues in the Representation and Processing of Uncertain and Imprecise Information. Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets, and Related Topics*. EXIT, Warsaw (2005)
47. Bustince, H., Barrenechea, E., Pagola, M.: Image thresholding using restricted equivalence functions and maximizing the measures of similarity. *Fuzzy Sets and Systems* 158, 496–516 (2007)
48. Bustince, H., Barrenechea, E., Pagola, M.: Relationship between restricted dissimilarity functions, restricted equivalence functions and normal en-functions: Image thresholding invariant. *Pattern Recognition Letters* 29, 525–536 (2008)
49. Carroll, J.D., Wish, M.: Multidimensional perceptual models and measurement methods. In: Carterette, E.C., Friedman, M.P. (eds.) *Handbook of Perception*. Academic Press, New York (1974)
50. Chiang, D.-A., Lin, N.P.: Correlation of fuzzy sets. *Fuzzy Sets and Systems* 102, 221–226 (1999)
51. Chen, S.M.: Measures of similarity between vague sets. *Fuzzy Sets and Systems* 74(2), 217–223 (1995)
52. Chen, S.M.: Similarity measures between vague sets and between elements. *IEEE Trans. Syst. Mn Cybernet.* 27(1), 153–158 (1997)
53. Chen, S.M., Tan, J.M.: Handling multi-criteria fuzzy decision-making problems based on vague-set theory. *Fuzzy Sets and Systems* 67(2), 163–172 (1994)
54. Clarke, K.R., Somerfield, P.J., Chapman, M.G.: On resemblance measures for ecological studies, including taxonomic dissimilarities and a zero-adjusted Bray-Curtis coefficient for denuded assemblages. *Journal of Experimental Marine Biology and Ecology* 330, 55–80 (2006)
55. Cross, V., Sudkamp, T.: *Similarity and Compatibility in Fuzzy Set Theory*. Physica-Verlag (2002)
56. Delgado, M., Moral, S.: On the concept of possibility-probability consistency. *Fuzzy Sets and Systems* 21, 311–318 (1987)
57. Dempster, A.P.: Upper and lower probabilities induced by a multivalued mapping. *Annals of Mathematical Statistics* 38(2), 325–339 (1967a)
58. Dempster, A.P.: Upper and lower probability inferences based on a sample from a finite univariate population. *Biometrika* 54(3), 515–528 (1967b)
59. Dempster, A.P.: A generalization of Bayesian inference. *J. of the Royal Statistical Society, Series B* 30, 205–247 (1968)
60. Li, D.-F.: Multiattribute decision making models and methods using intuitionistic fuzzy sets. *Journal of Computer and System Sciences* 70, 73–85 (2005)
61. Dubois, D., Prade, H.: *Fuzzy Sets and Systems: Theory and Applications*. Academic Press, Incorporated (1980)
62. Dubois, D., Prade, H.: On several representations of an uncertain body of evidence. In: Gupta, M.M., Sanchez, E. (eds.) *Fuzzy Information and Decision Processes*, pp. 167–181. North-Holland (1982)
63. Dubois, D., Prade, H.: Unfair coins and necessity measures: towards a possibilistic interpretation of histograms. *Fuzzy Sets and Systems* 10, 15–20 (1983)
64. Dubois, D., Prade, H.: The three semantics of fuzzy sets. *Fuzzy Sets and Systems* 90, 141–150 (1997)
65. Dubois, D., Prade, H.: Interval-valued fuzzy sets, possibility theory and imprecise probability. In: *EUSFLAT-LFA 2005*, pp. 314–319 (2005)

66. Dubois, D., Prade, H.: *Fundamentals of fuzzy sets*. Kluwer Academic Publishers, Boston (2000)
67. Dubois, D.: On degrees of truth, partial ignorance and contradiction. In: Magdalena, L., Ojeda-Aciego, M., Verdegay, J.M. (eds.) *Proc. IPMU 2008*, pp. 31–38 (2008)
68. Dubois, D., Foulloy, L., Mauris, G., Prade, H.: Probability-possibility transformations, triangular fuzzy sets, and probabilistic inequalities. *Reliable Computing* 10, 273–297 (2004)
69. Emran, S.M., Ye, N.: Robustness of Canberra metric in computer intrusion detection. In: *Proceedings of the 2001 IEEE, Workshop on Information Assurance and Security*, United States Military Academy, West Point, New York (2001)
70. Fan, J., Xie, W.: Distance measure and induced fuzzy entropy. *Fuzzy Sets and Systems* 104, 305–314 (1999)
71. Field, J.G., Clarke, K.R., Warwick, R.M.: A practical strategy for analysing multi-species distribution patterns. *Marine Ecology Progress Series* 8, 37–52 (1982)
72. Gau, W.L., Buehrer, D.J.: Vague sets. *IEEE Trans. Systems Man Cybernet* 23, 610–614 (1993)
73. Gersternkorn, T., Manko, J.: Correlation of intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 44, 39–43 (1991)
74. Goguen, J.A.: L-fuzzy sets. *Journal of Mathematical Analysis and Applications* 18(1), 145–174 (1967)
75. Goguen, J.A.: The logic of inexact concepts. *Synthese* 19(3/4), 325–373 (1969)
76. Gomide, F., Pedrycz, W.: *An Introduction to Fuzzy Sets: Analysis and Design*. MIT Press, Cambridge (1998)
77. Grünbaum, B.: *Convex Polytopes*. Wiley Interscience, New York (1967)
78. Hanson, L.R., Imperatore, G., Bennett, P.H., Knowler, W.C.: Components of the “Metabolic Syndrome” and Incidence of Type 2 Diabetes. *Diabetes* 51, 3120–3127 (2002)
79. Higashi, M., Klir, G.: On measures of fuzziness and fuzzy complements. *International Journal General Systems* 8, 169–180 (1982)
80. Hong, D.H., Choi, C.H.: Multicriteria fuzzy decision making problems based on vague set theory. *Fuzzy Sets and Systems* 114, 103–113 (2000)
81. Hong, D.H., Hwang, S.Y.: Correlation of intuitionistic fuzzy sets in probability spaces. *Fuzzy Sets and Systems* 75, 77–81 (1995)
82. Hong, D.H., Hwang, S.Y.: A note on the correlation of fuzzy numbers. *Fuzzy Sets and Systems* 79, 401–402 (1996)
83. Hong, D.H., Kim, C.: A note on similarity measures between vague sets and between elements. *Inform Science* 115, 83–96 (1999)
84. Hubálek, Z.: Coefficients of association and similarity, based on binary (presence-absence) data: An evaluation. *Biological Reviews* 57, 669–689 (1982)
85. Hung, W.L.: Using statistical viewpoint in developing correlation of intuitionistic fuzzy sets. *Int. Journal of Uncertainty, Fuzziness and Knowledge-Based systems* 9(4), 509–516 (2001)
86. Hung, W.L., Wu, J.W.: Correlation of intuitionistic fuzzy sets by centroid method. *Information Sciences* 144, 219–225 (2002)
87. Hung, W.-L., Yang, M.-S.: Similarity measures of intuitionistic fuzzy sets based on Hausdorff distance. *Pattern Recognition Letters* 25, 1603–1611 (2004)
88. Hung, W.L., Yang, M.S.: On similarity measures between intuitionistic fuzzy sets. *International Journal of Intelligent Systems* 23(3), 364–383 (2008)
89. Huttenlocher, D., Klanderma, G., Rucklidge, W.: Comparing images using the Hausdorff distance. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 15(9), 850–863 (1993)

90. Huttenlocher, D., Rucklidge, W.: A multi-resolution technique for computing images using the Hausdorff distance. In: Proc. Computer Vision and Pattern Recognition, New York, pp. 705–708 (1993)
91. Kacprzyk, J.: Group decision making with a fuzzy linguistic majority. *Fuzzy Sets and Systems* 18, 105–118 (1986)
92. Kacprzyk, J., Fedrizzi, M.: 'Soft' consensus measures for monitoring real consensus reaching processes under fuzzy preferences. *Control and Cybernetics* 15, 309–323 (1986)
93. Kacprzyk, J., Fedrizzi, M.: A 'soft' measure of consensus in the setting of partial (fuzzy) preferences. *European Journal of Operational Research* 34, 315–325 (1988)
94. Kacprzyk, J., Fedrizzi, M.: A 'human-consistent' degree of consensus based on fuzzy logic with linguistic quantifiers. *Mathematical Social Sciences* 18, 275–290 (1989)
95. Kacprzyk, J., Fedrizzi, M., Nurmi, H.: Group decision making and consensus under fuzzy preferences and fuzzy majority. *Fuzzy Sets and Systems* 49, 21–32 (1992)
96. Kacprzyk, J., Fedrizzi, M., Nurmi, H.: Fuzzy logic with linguistic quantifiers in group decision making. In: Yager, R., Zadeh, L. (eds.) *An Introduction to Fuzzy Logic Applications in Intelligent Systems*, pp. 263–280. Kluwer Academic Publishers, Norwell (1992)
97. Kacprzyk, J.: *Multistage Fuzzy Control*. Wiley, Chichester (1997)
98. Kahneman, D.: *Maps of bounded rationality: a perspective on intuitive judgment and choice*. Nobel Prize Lecture (2002)
99. Kaufmann, A.: *Introduction to the theory of fuzzy sets*. Academic Press, New York (1975)
100. Kelley, J.: *General topology*. D. van Nostrand Co., Toronto (1957)
101. Kendler, K.S., Josef Parnas, J.: *Philosophical Issues in Psychiatry: Explanation, Phenomenology, and Nosology*. Johns Hopkins University Press (2008)
102. Krebs, C.J.: *Ecological Methodology*. Harper-Collins, New-York (1989)
103. Lance, G.N., Williams, W.T.: Mixed-data classificatory programs I. *Agglomerative Systems*. *Australian Computer Journal* 1, 15–20 (1967)
104. Klir, G.J.: Where do we stand on measures of uncertainty, ambiguity, fuzziness, and the like? *Fuzzy Sets and Systems* 24, 141–160 (1987)
105. Klir, G.J.: *Facets of Systems Science*. Plenum Press, New York (1991)
106. Klir, G.J.: *Uncertainty and Information. Foundations of Generalized Information Theory*. John Wiley and Sons, Inc., New Jersey (2006)
107. Klir, G.J., Folger, T.A.: *Fuzzy Sets, Uncertainty and Information*. Prentice Hall, Englewood Cliffs (1988)
108. Klir, G.J., Wierman, M.J.: *Uncertainty-Based Information. Elements of Generalized Information Theory*. Physica-Verlag, Heidelberg (1998)
109. Klir, G.J., Yuan, B.: *Fuzzy Sets and Fuzzy Logic. Theory and Applications*. Prentice Hall PTR, New York (1995)
110. Lee, S.H., Pedrycz, W., Sohn, G.: Design of Similarity and Dissimilarity Measures for Fuzzy Sets on the Basis of Distance Measure. *International Journal of Fuzzy Systems* 11(2), 67–71 (2009)
111. Li, D.F., Cheng, C.T.: New similarity measures of intuitionistic fuzzy sets and application to pattern recognitions. *Pattern Recognition Letters* 23, 221–225 (2002)
112. Li, F., Lu, A., Cai, L.: Methods of multi-criteria fuzzy decision making base on vague sets. *J. of Huazhong Univ. of Science and Technology* 29(7), 1–3 (2001)
113. Li, Y., Olson, D.L., Qin, Z.: Similarity measures between intuitionistic fuzzy (vague) sets: A comparative analysis. *Pattern Recognition Letters* 28, 278–285 (2007)

114. Li, F., Rao, Y.: Weighted methods of multi-criteria fuzzy decision making based on vague sets. *Computer Science* 28(7), 60–65 (2001)
115. Li, Y., Zhongxian, C., Degin, Y.: Similarity measures between vague sets and vague entropy. *J. Computer Sci.* 29(12), 129–132 (2002)
116. Liang, Z., Shi, P.: Similarity measures on intuitionistic fuzzy sets. *Pattern Recognition Lett.* 24, 2687–2693 (2003)
117. Liu, X.: Entropy, distance mmeasure of fuzzy sets and their relations. *Fuzzy Sets and Systems* 52, 305–318 (1992)
118. Liu, S.-T., Kao, C.: Fuzzy measures for correlation coefficient of fuzzy numbers. *Fuzzy Sets and Systems* 128, 267–275 (2002)
119. Liu, H.-W., Wang, G.-J.: Multi-criteria decision making methods based on intuitionistic fuzzy sets. *European Journal of Operational Research* 179, 220–233 (2007)
120. Loewer, B., Laddaga, R.: Destroying the consensus. In: Loewer, B. (ed.) *Special Issue on Consensus*. Synthese, vol. 62, pp. 79–96 (1985)
121. Mahalanobis, P.C.: On the generalised distance in statistics. *Proceedings of the National Institute of Sciences of India* 2(1), 49–55 (1936)
122. McLachlan, G.J.: *Discriminant Analysis and Statistical Pattern Recognition*. Wiley Interscience (1992)
123. Mitchell, H.B.: On the Dengfeng-Chuntian similarity measure and its application to pattern recognition. *Pattern Recognition Lett.* 24, 3101–3104 (2003)
124. Montero, J., Gómez, D., Bustince, H.: On the relevance of some families of fuzzy sets. *Fuzzy Sets and Systems* 158, 2429–2442 (2007)
125. Moore, R.E.: *Interval Analysis*. Prentice-Hall, New York (1966)
126. Narukawa, Y., Torra, V.: Non-monotonic fuzzy measures and intuitionistic fuzzy sets. In: Torra, V., Narukawa, Y., Valls, A., Domingo-Ferrer, J. (eds.) *MDAI 2006. LNCS (LNAI)*, vol. 3885, pp. 150–160. Springer, Heidelberg (2006)
127. Olson, C., Huttenlocher, D.: Automatic target recognition by matching oriented edge pixels. *IEEE Trans. on Image Processing* 6(1), 103–113 (1997)
128. Pal, N.R., Pal, S.K.: Entropy: a new definition and its applications. *IEEE Trans. on Systems, Man, and Cybernetics* 21(5), 1260–1270 (1991)
129. Pappis, C.P., Karacapilidis, N.: A comparative assessment of measures of similarity of fuzzy values. *Fuzzy Sets and Systems* 56, 171–174 (1993)
130. Paternain, D., Jurio, A., Bustince, H., Beliakov, G.: Image magnification using Atanassovs intuitionistic fuzzy sets
131. Jurio, A., Pagola, M., Mesiar, R., Beliakov, G., Bustince, H.: Image Magnification Using Interval Information. *IEEE Transactiona on Image Processing* 20(11), 3112–3123 (2011)
132. Pawlak, Z.: Rough sets. *International Journal of Parallel Programming* 11(5), 341–356 (1982)
133. Pedrycz, W.: *Fuzzy Control and Fuzzy Systems*, 2nd extended edn. Research Studies Press/John Wiley, Taunton (1993)
134. Pedrycz, W.: *Fuzzy Sets Engineering*. CRC Press, Boca Raton (1995)
135. Pedrycz, W., Gomide, F.: *An Introduction to Fuzzy Sets. Analysis and Design*. A Bradford Book. The MIT Press, Cambridge (1998)
136. Peitgen, H.O., Jürgens, H., Saupe, D.: *Introduction to Fractals and Chaos*. Springer, New York (1992)
137. Preparata, F.P., Shamos, M.I.: *Computational Geometry. An Introduction*. Springer, New York (1985)
138. Quinlan, J.R.: Induction of decision trees. *Machine Learning* 1, 81–106 (1986)

139. Ralescu, D.A.: Cardinality, quantifiers, and the aggregation of fuzzy criteria. *Fuzzy Sets and Systems* 69, 355–365 (1995)
140. Rodgers, J.L., Alan Nicewander, W.: Thirteen Ways to Look at the Correlation Coefficient. *The American Statistician* 42(1), 59–66 (1988)
141. Rote, G.: Computing the minimum Hausdorff distance between two point sets on a line under translation. *Information Processing Letters* 38, 123–127 (1991)
142. Rucklidge, W.J.: Lower bounds for the complexity of Hausdorff distance. Tech. report TR 94-1441, Dept. of computer science, Cornell University, NY. A similar title appeared in Proc. 5th Canad. Conf. on Comp. Geom (CCCG 1993), Waterloo, CA, pp. 145–150 (1995)
143. Rucklidge, W.J.: Efficient computation of the minimum Hausdorff distance for visual recognition. Ph.D. thesis, Dept. of computer science, Cornell University, NY (1995)
144. Rucklidge, W.J.: Locating objects using the Hausdorff distance. In: Proc. of 5th Int. Conf. on Computer Vision (ICCV 1995), Cambridge, MA, pp. 457–464 (1995)
145. Rucklidge, W.J.: Efficient Visual Recognition Using the Hausdorff Distance. LNCS, vol. 1173. Springer, Heidelberg (1996)
146. Rucklidge, W.J.: Efficiently locating objects using the Hausdorff distance. *Int. Journal of Computer Vision* 24(3), 251–270 (1997)
147. Rutkowski, L.: *Computational Intelligence: Methods and Techniques*. Springer, Heidelberg (2008)
148. Salton, G., McGill, M.J.: *Introduction to Modern Information Retrieval*. McGraw-Hill Book Company, New York (1983)
149. Schwartz, L.: *Analyse Mathématique*, Hermann, Paris (1967)
150. Shafer, G.: *A Mathematical Theory of Evidence*. Princeton Univ. Press (1976)
151. Shackle, G.L.: *Decision, Order and Time in Human Affairs*. Cambridge University Press, Edinburgh (1961)
152. Shepard, R.N.: Representation of structure in similarity data: Problems and prospects. *Psychometrika* 39, 373–421 (1974)
153. Smets, P.: Constructing the pignistic probability function in a context of uncertainty. In: Henrion, M., Schachter, R., Kanal, L., Lemmer, J. (eds.) *Uncertainty in Artificial Intelligence*, vol. 5, pp. 29–39. North-Holland, Amsterdam (1990)
154. Sudkamp, T.: Similarity, interpolation, and fuzzy rule construction. *Fuzzy Sets and Systems* 58(1), 73–86 (1993)
155. Sugeno, M.: *Theory of Fuzzy Integrals and its Applications*. Tokyo Institute of Technology, Japan (1974)
156. Sugeno, M.: Fuzzy measures and fuzzy integrals: A survey. In: Gupta, M., Saridis, G., Gaines, B. (eds.) *Fuzzy Automata and Decision Processes*, pp. 89–102. North Holland, Amsterdam (1977)
157. Sutherland, S.: *Irrationality. The Enemy Within*. Penguin Books (1994)
158. Szmidt, E.: Applications of Intuitionistic Fuzzy Sets in Decision Making (D.Sc. dissertation), Technical University, Sofia (2000)
159. Szmidt, E., Baldwin, J.: New similarity measure for intuitionistic fuzzy set theory and mass assignment theory. *Notes on Intuitionistic Fuzzy Sets* 9(3), 60–76 (2003)
160. Szmidt, E., Baldwin, J.: Entropy for intuitionistic fuzzy set theory and mass assignment theory. *Notes on Intuitionistic Fuzzy Sets* 10(3), 15–28 (2004)
161. Szmidt, E., Baldwin, J.: Assigning the parameters for Intuitionistic Fuzzy Sets. *Notes on Intuitionistic Fuzzy Sets* 11(6), 1–12 (2005)
162. Szmidt, E., Baldwin, J.: Intuitionistic Fuzzy Set Functions, Mass Assignment Theory, Possibility Theory and Histograms. In: 2006 IEEE World Congress on Computational Intelligence, pp. 237–243 (2006)

163. Szmidt, E., Kacprzyk, J.: Intuitionistic fuzzy sets in group decision making. *Notes on Intuitionistic Fuzzy Sets* 2, 15–32 (1996a)
164. Szmidt, E., Kacprzyk, J.: Remarks on some applications of intuitionistic fuzzy sets in decision making. *Notes on Intuitionistic Fuzzy Sets* 2(3), 22–31 (1996c)
165. Szmidt, E., Kacprzyk, J.: On measuring distances between intuitionistic fuzzy sets. *Notes on Intuitionistic Fuzzy Sets* 3(4), 1–13 (1997)
166. Szmidt, E., Kacprzyk, J.: A Fuzzy Set Corresponding to an Intuitionistic Fuzzy Set. *International Journal of Uncertainty, Fuzziness and Knowledge Based Systems* 6(5), 427–435 (1998)
167. Szmidt, E., Kacprzyk, J.: Group Decision Making under Intuitionistic Fuzzy Preference Relations. In: *Proc. IPMU 1998, Paris, La Sorbonne*, pp. 172–178 (1998a)
168. Szmidt, E., Kacprzyk, J.: Applications of Intuitionistic Fuzzy Sets in Decision Making. In: *EUSFLAT 1999*, pp. 150–158 (1998b)
169. Szmidt, E., Kacprzyk, J.: Probability of Intuitionistic Fuzzy Events and their Applications in Decision Making. In: *Proc. of EUSFLAT-ESTYLF, Palma de Mallorca*, pp. 457–460 (1999)
170. Szmidt, E., Kacprzyk, J.: A Concept of a Probability of an Intuitionistic Fuzzy Event. In: *Proc. of FUZZ-IEEE 1999 - 8th IEEE International Conference on Fuzzy Systems, Seoul, Korea, III*, pp. 1346–1349 (1999b)
171. Szmidt, E., Kacprzyk, J.: Distances between intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 114(3), 505–518 (2000)
172. Szmidt, E., Kacprzyk, J.: On Measures on Consensus Under Intuitionistic Fuzzy Relations. In: *IPMU 2000*, pp. 1454–1461 (2000)
173. Szmidt, E., Kacprzyk, J.: On Measures of Consensus Under Intuitionistic Fuzzy relations. In: *Proc. IPMU 2000, Madrid, July 3-7*, pp. 641–647 (2000b)
174. Szmidt, E., Kacprzyk, J.: Analysis of Consensus under Intuitionistic Fuzzy Preferences. In: *Proc. Int. Conf. in Fuzzy Logic and Technology*, pp. 79–82. De Montfort Univ, Leicester (2001)
175. Szmidt, E., Kacprzyk, J.: Entropy for intuitionistic fuzzy sets. *Fuzzy Sets and Systems* 118(3), 467–477 (2001)
176. Szmidt, E., Kacprzyk, J.: Distance from Consensus Under Intuitionistic Fuzzy Preferences. In: *Proc. EUROFUSE Workshop on Preference Modeling and Applications, Granada*, pp. 73–78 (2001)
177. Szmidt, E., Kacprzyk, J.: Analysis of Agreement in a Group of Experts via Distances Between Intuitionistic Fuzzy Preferences. In: *Proc. 9th Int. Conference IPMU 2002, Annecy, France*, pp. 1859–1865 (2002a)
178. Szmidt, E., Kacprzyk, J.: An Intuitionistic Fuzzy Set Based Approach to Intelligent Data Analysis (an application to medical diagnosis). In: Abraham, A., Jain, L., Kacprzyk, J. (eds.) *Recent Advances in Intelligent Paradigms and Applications*, pp. 57–70. Springer (2002c)
179. Szmidt, E., Kacprzyk, J.: Evaluation of Agreement in a Group of Experts via Distances Between Intuitionistic Fuzzy Sets. In: *Proc. IS 2002 – Int. IEEE Symposium: Intelligent Systems, Varna, Bulgaria, IEEE Catalog Number 02EX499*, pp. 166–170 (2002c)
180. Szmidt, E., Kacprzyk, J.: Similarity of intuitionistic fuzzy sets and the Jaccard coefficient. In: *IPMU 2004*, pp. 1405–1412 (2004)
181. Szmidt, E., Kacprzyk, J.: A Concept of Similarity for Intuitionistic Fuzzy Sets and its use in Group Decision Making. In: *2004 IEEE Conf. on Fuzzy Systems, Budapest*, pp. 1129–1134 (2004)

182. Szmidt, E., Kacprzyk, J.: A New Concept of a Similarity Measure for Intuitionistic Fuzzy Sets and Its Use in Group Decision Making. In: Torra, V., Narukawa, Y., Miyamoto, S. (eds.) MDAI 2005. LNCS (LNAI), vol. 3558, pp. 272–282. Springer, Heidelberg (2005)
183. Szmidt, E., Kacprzyk, J.: A new Similarity Measure for Intuitionistic Fuzzy Sets and its use in Supporting a Medical Diagnosis. Notes on Intuitionistic Fuzzy Sets 11(4), 130–138 (2005)
184. Szmidt, E., Kacprzyk, J.: Distances Between Intuitionistic Fuzzy Sets and their Applications in Reasoning. SCI, vol. 2 (2005)
185. Szmidt, E., Kacprzyk, J.: New Measures of Entropy for Intuitionistic Fuzzy Sets. Notes on Intuitionistic Fuzzy Sets 11(2), 12–20 (2005)
186. Szmidt, E., Kacprzyk, J.: Similarity Measures for Intuitionistic Fuzzy Sets. In: Atanassov, K.T., Kacprzyk, J., Krawczak, M., Szmidt, E. (eds.) Issues in the Representation and Processing of Uncertain and Imprecise Information. Problems of Contemporary Science, pp. 355–372. EXIT, Warsaw (2005)
187. Szmidt, E., Kacprzyk, J.: A new measure of entropy and its connection with a similarity measure for intuitionistic fuzzy sets. In: Proceedings of the 4th Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT 2005), Barcelona, pp. 1–6 (2005)
188. Szmidt, E., Kacprzyk, J.: Distances between intuitionistic fuzzy sets: straightforward approaches not work. In: 3rd International IEEE Conference Intelligent Systems, IS 2006, London, pp. 716–721 (May 2006)
189. Szmidt, E., Kacprzyk, J.: An Application of Intuitionistic Fuzzy Set Similarity Measures to a Multi-criteria Decision Making Problem. In: Rutkowski, L., Tadeusiewicz, R., Zadeh, L.A., Żurada, J.M. (eds.) ICAISC 2006. LNCS (LNAI), vol. 4029, pp. 314–323. Springer, Heidelberg (2006)
190. Szmidt, E., Kacprzyk, J.: A Model of Case Based Reasoning Using Intuitionistic Fuzzy Sets. In: 2006 IEEE World Congress on Computational Intelligence, pp. 8428–8435 (2006)
191. Szmidt, E., Kacprzyk, J.: Entropy and similarity for intuitionistic fuzzy sets. In: 11th Int. Conf. IPMU, Paris, pp. 2375–2382 (2006)
192. Szmidt, E., Kacprzyk, J.: Some Problems with Entropy Measures for the Atanassov Intuitionistic Fuzzy Sets. In: Masulli, F., Mitra, S., Pasi, G. (eds.) WILF 2007. LNCS (LNAI), vol. 4578, pp. 291–297. Springer, Heidelberg (2007)
193. Szmidt, E., Kacprzyk, J.: A New Similarity Measure for Intuitionistic Fuzzy Sets: Straightforward Approaches may not work. In: 2007 IEEE Conf. on Fuzzy Systems, pp. 481–486 (2007a)
194. Szmidt, E., Kacprzyk, J.: Classification with nominal data using intuitionistic fuzzy sets. In: Melin, P., Castillo, O., Aguilar, L.T., Kacprzyk, J., Pedrycz, W. (eds.) IFSA 2007. LNCS (LNAI), vol. 4529, pp. 76–85. Springer, Heidelberg (2007)
195. Szmidt, E., Kacprzyk, J.: Two and three parameter representation of intuitionistic fuzzy sets in the context of entropy and similarity. Notes on Intuitionistic Fuzzy Sets 13(2), 8–17 (2007)
196. Szmidt, E., Kacprzyk, J.: Dilemmas with Distances Between Intuitionistic Fuzzy Sets: Straightforward Approaches Not Work. SCI, vol. 109, pp. 415–430. Springer, Heidelberg (2008)
197. Szmidt, E., Kacprzyk, J.: Ranking alternatives expressed via intuitionistic fuzzy sets. In: 12th International Conference, IPMU 2008, pp. 1604–1611 (2008)

198. Szmidt, E., Kacprzyk, J.: A new approach to ranking alternatives expressed via intuitionistic fuzzy sets. In: Ruan, D., et al. (eds.) *Computational Intelligence in Decision and Control*, pp. 265–270. World Scientific (2008)
199. Szmidt, E., Kacprzyk, J.: Intuitionistic fuzzy sets - a prospective tool for text categorization. In: Atanassov, K., Chountas, P., Kacprzyk, J., et al. (eds.) *Developments in Fuzzy Sets, Intuitionistic Fuzzysets, Generalized Nets and Related Topics. Applications*, vol. II, pp. 281–300. Academic Publishing House EXIT; Systems Research Institute PAS, Warsaw (2008)
200. Szmidt, E., Kacprzyk, J.: Intuitionistic fuzzy sets as a promising tool for extended fuzzy decision making models. In: Bustince, H., Herrera, F., Montero, J. (eds.) *Fuzzy Sets and Their Extensions: Representation, Aggregation and Models. STUDFUZZ*, vol. 220, pp. 330–355. Springer, Heidelberg (2008)
201. Szmidt, E., Kacprzyk, J.: Ranking intuitionistic fuzzy alternatives. *Notes on Intuitionistic Fuzzy Sets* 14(1), 48–56 (2008)
202. Szmidt, E., Kacprzyk, J.: Using intuitionistic fuzzy sets in text categorization. In: Rutkowski, L., Tadeusiewicz, R., Zadeh, L.A., Zurada, J.M. (eds.) *ICAISC 2008. LNCS (LNAI)*, vol. 5097, pp. 351–362. Springer, Heidelberg (2008)
203. Szmidt, E., Kacprzyk, J.: Dealing with Typical Values by using Atanassov's Intuitionistic Fuzzy Sets. In: *Proceedings of 2008 IEEE World Congress on Computational Intelligence*, Hong Kong, June 1-6 (2008)
204. Szmidt, E., Kacprzyk, J.: On Some Typical Values for Atanassov's Intuitionistic Fuzzy Sets. In: *Proc. of the 4th International IEEE Conference "Intelligent Systems"*, Varna, Bulgaria, vol. I, pp. 13-2-13-7 (2008)
205. Szmidt, E., Kacprzyk, J.: Amount of information and its reliability in the ranking of Atanassov's intuitionistic fuzzy alternatives. In: Rakus-Andersson, E., Yager, R., Ichalkaranje, N., Jain, L.C. (eds.) *Recent Advances in Decision Making. SCI*, vol. 222, pp. 7–19. Springer, Heidelberg (2009)
206. Szmidt, E., Kacprzyk, J.: Ranking of Intuitionistic Fuzzy Alternatives in a Multi-criteria Decision Making Problem. In: *Proceedings of the Conference, NAFIPS 2009*, Cincinnati, USA, June 14- 17, IEEE (2009) ISBN: 978-1-4244-4577-6
207. Szmidt, E., Kacprzyk, J.: Analysis of Similarity Measures for Atanassov's Intuitionistic Fuzzy Sets. In: *Proceedings IFSA/EUSFLAT 2009*, pp. 1416–1421 (2009)
208. Szmidt, E., Kacprzyk, J.: A method for ranking alternatives expressed via Atanassov's intuitionistic fuzzy sets. In: Atanassov, K.T., Hryniewicz, O., Kacprzyk, J., Krawczak, M., Nahorski, Z., Szmidt, E., Zadrony, S. (eds.) *Advances in Fuzzy Sets, Intuitionistics Fuzzy Sets, Generalized Nets and Related Topics. Challenging Problems of Science - Computer Science*, pp. 161–173. Academic Publishing House EXIT, Warsaw (2009)
209. Szmidt, E., Kacprzyk, J.: Some remarks on the Hausdorff distance between Atanassov's intuitionistic fuzzy sets. In: *EUROFUSE WORKSHOP 2009. Preference Modelling and Decision Analysis*, Pamplona (Spain), pp. 311–316. Public University of Navarra (2009)
210. Szmidt, E., Kacprzyk, J.: A note on the Hausdorff distance between Atanassov's intuitionistic fuzzy sets. *Notes on Intuitionistic Fuzzy Sets* 15(1), 1–12 (2009)
211. Szmidt, E., Kacprzyk, J.: Correlation of intuitionistic fuzzy sets. In: Hüllermeier, E., Kruse, R., Hoffmann, F. (eds.) *IPMU 2010. LNCS*, vol. 6178, pp. 169–177. Springer, Heidelberg (2010)
212. Szmidt, E., Kacprzyk, J.: The Spearman rank correlation coefficient between intuitionistic fuzzy sets. In: *Proc. 2010 IEEE Int. Conf. on Intelligent Systems, IEEE'IS 2010*, London, pp. 276–280 (2010)

213. Szmidt, E., Kacprzyk, J.: Dealing with typical values via Atanassov's intuitionistic fuzzy sets. *International Journal of General Systems* 39(5), 489–596 (2010)
214. Szmidt, E., Kacprzyk, J.: On an Enhanced Method for a More Meaningful Ranking of Intuitionistic Fuzzy Alternatives. In: Rutkowski, L., Scherer, R., Tadeusiewicz, R., Zadeh, L.A., Zurada, J.M. (eds.) *ICAISC 2010, Part I. LNCS*, vol. 6113, pp. 232–239. Springer, Heidelberg (2010)
215. Szmidt, E., Kacprzyk, J.: On the Hamming-metric based Hausdorff Distance for Intuitionistic Fuzzy Sets and Interval-valued Fuzzy Sets. In: Atanassov, K.T., et al. (eds.) *Developments in Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets and Related Topics*, pp. 209–223. SRI PAS, Warszawa (2010)
216. Szmidt, E., Kacprzyk, J., Bujnowski, P.: On some measures of information and knowledge for intuitionistic fuzzy sets. *Notes on Intuitionistic Fuzzy Sets* 16(2), 1–11 (2010)
217. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Information and Knowledge in the Context of Atanassov's Intuitionistic Fuzzy Set. In: *Proc. of the 10th International Conference on Intelligent Systems Design and Applications*, Cairo, Egypt, pp. 702–707 (2010)
218. Szmidt, E., Kacprzyk, J.: Intuitionistic fuzzy sets – Two and three term representations in the context of a Hausdorff distance. *Acta Universitatis Matthiae Belii, Series Mathematica* 19(19), 53–62 (2011), <http://ACTAMTH.SAVBB.SK>
219. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Measuring the Amount of Knowledge for Atanassov's Intuitionistic Fuzzy Sets. In: Petrosino, A. (ed.) *WILF 2011. LNCS (LNAI)*, vol. 6857, pp. 17–24. Springer, Heidelberg (2011)
220. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Pearson's coefficient between intuitionistic fuzzy sets. *Notes on Intuitionistic Fuzzy Sets* 17(2), 25–34 (2011)
221. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Pearson's Correlation Coefficient between Intuitionistic Fuzzy Sets: an Extended Theoretical and Numerical Analysis. In: Atanassov, K.T., et al. (eds.) *Recent Advances in Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets and Related Topics*, pp. 223–236. SRI PAS, Warsaw (2011)
222. Szmidt, E., Kacprzyk, J.: The Kendall Rank Correlation between Intuitionistic Fuzzy Sets. In: *Proc.: World Conference on Soft Computing*, San Francisco, CA, USA, 23/05/2011–26/05/2011 (2011)
223. Szmidt, E., Kacprzyk, J.: The Spearman and Kendall rank correlation coefficients between intuitionistic fuzzy sets. In: *Proc. 7th conf. European Society for Fuzzy Logic and Technology*, pp. 521–528. Antantic Press, Aix-Les-Bains (2011)
224. Szmidt, E., Kacprzyk, J.: On an Enhanced Method for a More Meaningful Pearson's Correlation Coefficient between Intuitionistic Fuzzy Sets. In: Rutkowski, L., Korytkowski, M., Scherer, R., Tadeusiewicz, R., Zadeh, L.A., Zurada, J.M. (eds.) *ICAISC 2012, Part I. LNCS*, vol. 7267, pp. 334–341. Springer, Heidelberg (2012)
225. Szmidt, E., Kacprzyk, J.: A new approach to principal component analysis for intuitionistic fuzzy data sets. In: Greco, S., Bouchon-Meunier, B., Coletti, G., Fedrizzi, M., Matarazzo, B., Yager, R.R. (eds.) *IPMU 2012, Part II. CCIS*, vol. 298, pp. 529–538. Springer, Heidelberg (2012)
226. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Correlation between Intuitionistic Fuzzy Sets: Some Conceptual and Numerical Extensions. In: *WCCI 2012, IEEE World Congress on Computational Intelligence*, Brisbane, Australia, pp. 480–486 (2012)
227. Szmidt, E., Kacprzyk, J., Bujnowski, P.: Advances in Principal Component Analysis for Intuitionistic Fuzzy Data Sets. In: *2012 IEEE 6th International Conference "Intelligent Systems"*, pp. 194–199 (2012)
228. Szmidt, E., Kreinovich, V.: Symmetry between true, false, and uncertain: An explanation. *Notes on Intuitionistic Fuzzy Sets* 15(4), 1–8 (2009)

229. Szmidt, E., Kukier, M.: Classification of Imbalanced and Overlapping Classes using Intuitionistic Fuzzy Sets. In: 3rd International IEEE Conference on Intelligent Systems, IS 2006, London, pp. 722–727 (2006)
230. Szmidt, E., Kukier, M.: A new approach to classification of imbalanced classes via Atanassov's intuitionistic fuzzy sets. In: Wang, H.-F. (ed.) *Intelligent Data Analysis: Developing New Methodologies Through Pattern Discovery and Recovery*, pp. 85–102. Idea Group (2008)
231. Szmidt, E., Kukier, M.: Atanassov's intuitionistic fuzzy sets in classification of imbalanced and overlapping classes. In: Chountas, P., Petrounias, I., Kacprzyk, J. (eds.) *Intelligent Techniques and Tools for Novel System Architectures*. SCI, vol. 109, pp. 455–471. Springer, Heidelberg (2008)
232. Szmidt, E., Kukier, M.: Intuitionistic fuzzy classifier - a tool for recognizing imbalanced classes. In: Atanassov, K., et al. (eds.) *New Developments in Fuzzy Sets, Intuitionistic Fuzzy Sets, Generalized Nets and Related Topics. Applications*, vol. II, pp. 287–296. Systems Research Institute, Polish Academy of Sciences, Warsaw (2012)
233. Szmidt, E., Kacprzyk, J., Kukier, M.: Intuitionistic fuzzy classifier for imbalanced classes. In: Rutkowski, L., Korytkowski, M., Scherer, R., Tadeusiewicz, R., Zadeh, L.A., Zurada, J.M. (eds.) *ICAISC 2013, Part I*. LNCS (LNAI), vol. 7894, pp. 483–492. Springer, Heidelberg (2013)
234. Tan, C., Zhang, Q.: Fuzzy multiple attribute TOPSIS decision making method based on intuitionistic fuzzy set theory. In: *Proc. IFSA 2005*, pp. 1602–1605 (2005)
235. Tanev, D.: On an intuitionistic fuzzy norm. *Notes on Intuitionistic Fuzzy Sets* 1(1), 25–26 (1995)
236. Tasseva, V., Szmidt, E., Kacprzyk, J.: On one of the geometrical interpretations of the intuitionistic fuzzy sets. *Notes on IFS* 11(3), 21–27 (2005)
237. Tversky, A.: Features of similarity. *Psychol. Rev.* 84, 327–352 (1977)
238. Veltkamp, R.C., Hagedoorn, M.: Shape similarity measures, properties and constructions. In: Laurini, R. (ed.) *VISUAL 2000*. LNCS, vol. 1929, pp. 467–476. Springer, Heidelberg (2000)
239. Veltkamp, R.: Shape Matching: similarity measures and algorithms. In: *Proc. Shape Modelling International*, pp. 187–197. IEEE Press, Italy (2001)
240. Veltkamp, R.C.: Shape Matching: Similarity Measures and Algorithms. *UU-CS-2001-3*, 1–17 (2001)
241. Wang, W.J.: New similarity measures on fuzzy sets and on elements. *Fuzzy Sets and Systems* 85, 305–309 (1997)
242. Wang, X., Kerre, E.: Reasonable properties for the ordering of fuzzy quantities (I). *Fuzzy Sets and Systems* 118, 375–385 (2001)
243. Wang, X., Kerre, E.: Reasonable properties for the ordering of fuzzy quantities (II). *Fuzzy Sets and Systems* 118, 387–405 (2001)
244. Wang, X., De Baets, B., Kerre, E.: A comparative study of similarity measures. *Fuzzy Sets and Systems* 73(2), 259–268 (1995)
245. Willims, W.T., Dale, M.B.: Fundamental problems in numerical taxonomy. *Advances in Botanical Research* 2, 35–68 (1965)
246. Wolda, H.: Similarity indices, sample size and diversity. *Oecologia* 50, 296–302 (1981)
247. Wygralak, M.: Vaguely defined objects – Representations, *Fuzzy Sets and Nonclassical Cardinality Theory*. Kluwer, Dordrecht (1996)
248. Yager, R.R.: Level sets for membership evaluation of fuzzy subsets. *Tech. Rep. RRY-79-14*, Iona Colledge, New York (1979); Also in: Yager, R. (ed.) *Fuzzy Set and Possibility Theory – Recent Developments*. Pergamon Press, Oxford, 90–97 (1982)

249. Yager, R.R., Kacprzyk, J., Fedrizzi, M. (eds.): *Advances in the Dempster-Shafer Theory of Evidence*. Wiley, New York (1994)
250. Yager, R.R.: On measures of fuzziness and negation. Part I: Membership in the unit interval. *International Journal General Systems* 5, 221–229 (1997)
251. Yamada, K.: Probability–Possibility Transformation Based on Evidence Theory. In: *Proc. IFSA–NAFIPS 2001*, pp. 70–75 (2001)
252. Ye, J.: Cosine similarity measures for intuitionistic fuzzy sets and their applications. *Mathematical and Computer Modelling* 53, 91–97 (2011)
253. Xu, Z.: Intuitionistic preference relations and their application in group decision making. *Information Sciences* 177, 2363–2379 (2007)
254. Zadeh, L.A.: Fuzzy sets. *Information and Control* 8, 338–353 (1965)
255. Zadeh, L.A.: Similarity relations and fuzzy orderings. *Information Sciences* 3, 177–200 (1971)
256. Zadeh, L.A.: Fuzzy Sets as the Basis for a Theory of Possibility. *Fuzzy Sets and Systems* 1, 3–28 (1978)
257. Zadeh, L.A.: A computational approach to fuzzy quantifiers in natural languages. *Computera and Mathematics with Applications* 9, 149–184 (1983)
258. Zadeh, L.A.: Fuzzy probabilities. *Information Processing and Management* 20, 363–372 (1986)
259. Zadeh, L.A.: Fuzzy logic, neural networks, and soft computing. *Communications of the ACM* 3(3), 77–84 (1994a)
260. Zadeh, L.A.: Soft computing and fuzzy logic. *IEEE Software* 11(6), 48–56 (1994b)
261. Zeng, W., Li, H.: Correlation coefficient of intuitionistic fuzzy sets. *Journal of Industrial Engineering International* 3(5), 33–40 (2007)
262. Zimmermann, H.J.: *Fuzzy Sets, Decision Making, and Expert Systems*. Kluwer, Dordrecht (1987)
263. Zimmermann, H.J.: *Fuzzy Set Theory and its Applications*, 3rd edn. Kluwer, Boston (1996)
264. <http://archive.ics.uci.edu/ml/datasets/Diabetes>
265. <http://archive.ics.uci.edu/ml/datasets/Iris>

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