



**Universiteit
Leiden**
The Netherlands

Multi-objective evolutionary algorithms for optimal scheduling

Wang, Y.

Citation

Wang, Y. (2022, January 19). *Multi-objective evolutionary algorithms for optimal scheduling*. Retrieved from <https://hdl.handle.net/1887/3250350>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3250350>

Note: To cite this publication please use the final published version (if applicable).

Bibliography

- [1] Ehsan Ahmadi, Mostafa Zandieh, Mojtaba Farrokh, and Seyed Mohammad Emami. A multi objective optimization approach for flexible job shop scheduling problem under random machine breakdown by evolutionary algorithms. *Computers & Operations Research*, 73:56–66, 2016.
- [2] Nasr Al-Hinai and Tarek Y ElMekkawy. Robust and stable flexible job shop scheduling with random machine breakdowns using a hybrid genetic algorithm. *International Journal of Production Economics*, 132(2):279–291, 2011.
- [3] Richard Allmendinger, Andrzej Jaskiewicz, Arnaud Liefooghe, and Christiane Tammer. What if we increase the number of objectives? theoretical and empirical implications for many-objective optimization. *arXiv preprint arXiv:2106.03275*, 2021.
- [4] Charles Audet, Jean Bignon, Dominique Cartier, Sébastien Le Digabel, and Ludovic Salomon. Performance indicators in multiobjective optimization. *European Journal of Operational Research*, 2020.
- [5] Thomas Bäck. *Evolutionary Algorithms in Theory and Practice: Evolution Strategies, Evolutionary Programming, Genetic Algorithms*. Oxford University Press, 1996.
- [6] Lucas S Batista, Felipe Campelo, Frederico G Guimaraes, and Jaime A Ramírez. Pareto cone ε -dominance: improving convergence and diversity in multiobjective evolutionary algorithms. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 76–90. Springer, 2011.
- [7] Slim Bechikh, Lamjed Ben Said, and Khaled Ghédira. Searching for knee regions in multi-objective optimization using mobile reference points. In *Proceedings of the 2010 ACM Symposium on Applied Computing*, pages 1118–1125, 2010.
- [8] Nicola Beume, Carlos M Fonseca, Manuel Lopez-Ibanez, Luis Paquete, and Jan Vahrenhold. On the complexity of computing the hypervolume indicator. *IEEE Transactions on Evolutionary Computation*, 13(5):1075–1082, 2009.
- [9] Nicola Beume, Boris Naujoks, and Michael Emmerich. Sms-emoa: Multiobjective selection based on dominated hypervolume. *European Journal of Operational Research*, 181(3):1653–1669, 2007.

Bibliography

- [10] Keomany Bouvard, Samuel Artus, Christophe Bérenguer, and Vincent Cocquempot. Condition-based dynamic maintenance operations planning & grouping. application to commercial heavy vehicles. *Reliability Engineering & System Safety*, 96(6):601–610, 2011.
- [11] Stephen Boyd, Stephen P Boyd, and Lieven Vandenbergh. *Convex Optimization*. Cambridge University Press, 2004.
- [12] Jürgen Branke, Kalyanmoy Deb, Henning Dierolf, and Matthias Osswald. Finding knees in multi-objective optimization. In *International Conference on Parallel Problem Solving from Nature*, pages 722–731. Springer, 2004.
- [13] Marlon Alexander Braun, Pradyumn Kumar Shukla, and Hartmut Schneck. Preference ranking schemes in multi-objective evolutionary algorithms. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 226–240. Springer, 2011.
- [14] Fatih Camci. System maintenance scheduling with prognostics information using genetic algorithm. *IEEE Transactions on Reliability*, 58(3):539–552, 2009.
- [15] Imran Ali Chaudhry and Abid Ali Khan. A research survey: Review of flexible job shop scheduling techniques. *International Transactions in Operational Research*, 23(3):551–591, 2016.
- [16] Tsung-Che Chiang and Hsiao-Jou Lin. A simple and effective evolutionary algorithm for multiobjective flexible job shop scheduling. *International Journal of Production Economics*, 141(1):87–98, 2013.
- [17] Carlos A Coello Coello, Gary B Lamont, David A Van Veldhuizen, et al. *Evolutionary Algorithms for Solving Multi-objective Problems*, volume 5. Springer, 2007.
- [18] Viviane Grunert Da Fonseca, Carlos M Fonseca, and Andreia O Hall. Inferential performance assessment of stochastic optimisers and the attainment function. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 213–225. Springer, 2001.
- [19] George B Dantzig. Discrete-variable extremum problems. *Operations Research*, 5(2):266–288, 1957.
- [20] Indraneel Das. On characterizing the “knee” of the Pareto curve based on normal-boundary intersection. *Structural Optimization*, 18(2-3):107–115, 1999.
- [21] Indraneel Das and John E Dennis. Normal-boundary intersection: A new method for generating the Pareto surface in nonlinear multicriteria optimization problems. *SIAM Journal on Optimization*, 8(3):631–657, 1998.
- [22] Kalyanmoy Deb. *Multi-Objective Optimization Using Evolutionary Algorithms*. John Wiley & Sons, Inc., New York, NY, USA, 2001.

- [23] Kalyanmoy Deb. Multi-objective evolutionary algorithms: Introducing bias among Pareto-optimal solutions. In *Advances in Evolutionary Computing*, pages 263–292. Springer, 2003.
- [24] Kalyanmoy Deb and Shivam Gupta. Towards a link between knee solutions and preferred solution methodologies. In *International Conference on Swarm, Evolutionary, and Memetic Computing*, pages 182–189. Springer, 2010.
- [25] Kalyanmoy Deb and Shivam Gupta. Understanding knee points in bicriteria problems and their implications as preferred solution principles. *Engineering Optimization*, 43(11):1175–1204, 2011.
- [26] Kalyanmoy Deb and Himanshu Jain. An evolutionary many-objective optimization algorithm using reference-point-based nondominated sorting approach, part i: Solving problems with box constraints. *IEEE Transactions on Evolutionary Computation*, 18(4):577–601, 2013.
- [27] Kalyanmoy Deb and Abhay Kumar. Light beam search based multi-objective optimization using evolutionary algorithms. In *2007 IEEE Congress on Evolutionary Computation*, pages 2125–2132. IEEE, 2007.
- [28] Kalyanmoy Deb and Abhishek Kumar. Interactive evolutionary multi-objective optimization and decision-making using reference direction method. In *Proceedings of the 9th Annual Conference on Genetic and Evolutionary Computation*, pages 781–788, 2007.
- [29] Kalyanmoy Deb, Amrit Pratap, Sameer Agarwal, and TAMT Meyarivan. A fast and elitist multi-objective genetic algorithm: NSGA-II. *IEEE Transactions on Evolutionary Computation*, 6(2):182–197, 2002.
- [30] Kalyanmoy Deb and J Sundar. Reference point based multi-objective optimization using evolutionary algorithms. In *Proceedings of the 8th Annual Conference on Genetic and Evolutionary Computation*, pages 635–642. ACM, 2006.
- [31] Aidin Delgoshaei, Ahad Ali, Mohd Khairul Anuar Ariffin, and Chandima Gomes. A multi-period scheduling of dynamic cellular manufacturing systems in the presence of cost uncertainty. *Computers & Industrial Engineering*, 100:110–132, 2016.
- [32] Yunus Demir and Selçuk Kürşat İşleyen. An effective genetic algorithm for flexible job-shop scheduling with overlapping in operations. *International Journal of Production Research*, 52(13):3905–3921, 2014.
- [33] André Deutz, Michael Emmerich, and Yali Wang. Many-criteria dominance relations. In Dimo Brockhoff, Michael Emmerich, Boris Naujoks, and Robin Purshouse, editors, *Many-Criteria Optimization and Decision Analysis*. Springer, Natural Computing Series, 2022.

Bibliography

- [34] Matthias Ehrgott. *Multicriteria Optimization*, volume 491. Springer Science & Business Media, 2005.
- [35] Hatem M Elattar, Hamdy K Elminir, and AM Riad. Prognostics: a literature review. *Complex & Intelligent Systems*, 2(2):125–154, 2016.
- [36] Michael TM Emmerich and André H Deutz. A tutorial on multiobjective optimization: fundamentals and evolutionary methods. *Natural Computing*, 17(3):585–609, 2018.
- [37] Michael TM Emmerich, André H Deutz, and Johannes W Krusselbrink. On quality indicators for black-box level set approximation. *EVOLVE - A Bridge between Probability, Set Oriented Numerics, and Evolutionary Computation*, pages 157–185, 2013.
- [38] Michael TM Emmerich, André H Deutz, and Iryna Yevseyeva. On reference point free weighted hypervolume indicators based on desirability functions and their probabilistic interpretation. *Procedia Technology*, 16:532–541, 2014.
- [39] Jesús Guillermo Falcón-Cardona, Carlos A Coello Coello, and Michael Emmerich. Cri-emoa: A pareto-front shape invariant evolutionary multi-objective algorithm. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 307–318. Springer, 2019.
- [40] Jesús Guillermo Falcón-Cardona, Hisao Ishibuchi, Carlos A Coello Coello, and Michael Emmerich. On the effect of the cooperation of indicator-based multi-objective evolutionary algorithms. *IEEE Transactions on Evolutionary Computation*, 2021.
- [41] Marco Farina and Paolo Amato. On the optimal solution definition for many-criteria optimization problems. In *2002 Annual Meeting of the North American Fuzzy Information Processing Society Proceedings. NAFIPS-FLINT 2002 (Cat. No. 02TH8622)*, pages 233–238. IEEE, 2002.
- [42] Parviz Fattahi and Alireza Fallahi. Dynamic scheduling in flexible job shop systems by considering simultaneously efficiency and stability. *CIRP Journal of Manufacturing Science and Technology*, 2(2):114–123, 2010.
- [43] Qiu Fei-yue, Wu Yu-shi, Wang Li-ping, and Jiang Bo. Bipolar preferences dominance based evolutionary algorithm for many-objective optimization. In *2012 IEEE Congress on Evolutionary Computation*, pages 1–8. IEEE, 2012.
- [44] Eduardo Fernandez, Edy Lopez, Fernando Lopez, and Carlos A Coello Coello. Increasing selective pressure towards the best compromise in evolutionary multiobjective optimization: The extended NOSGA method. *Information Sciences*, 181(1):44–56, 2011.
- [45] Mark Fleischer. The measure of pareto optima applications to multi-objective metaheuristics. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 519–533. Springer, 2003.

- [46] Carlos M Fonseca and Peter J Fleming. Multiobjective genetic algorithms. In *IEEE Colloquium on Genetic Algorithms for Control Systems Engineering*, pages 6–1. IET, 1993.
- [47] Alan D Fox, David W Corne, C Gabriela Mayorga Adame, Jeff A Polton, Lea-Anne Henry, and J Murray Roberts. An efficient multi-objective optimization method for use in the design of marine protected area networks. *Frontiers in Marine Science*, 6:17, 2019.
- [48] Michael R Garey, David S Johnson, and Ravi Sethi. The complexity of flowshop and jobshop scheduling. *Mathematics of operations research*, 1(2):117–129, 1976.
- [49] David Gaudrie, Rodolphe Le Riche, Victor Picheny, Benoit Enaux, and Vincent Herbert. Targeting solutions in bayesian multi-objective optimization: Sequential and batch versions. *Annals of Mathematics and Artificial Intelligence*, pages 1–26, 2019.
- [50] Jay B Ghosh. Computational aspects of the maximum diversity problem. *Operations Research Letters*, 19(4):175–181, 1996.
- [51] Ioannis Giagkiozis, Robin C Purshouse, and Peter J Fleming. Generalized decomposition and cross entropy methods for many-objective optimization. *Information Sciences*, 282:363–387, 2014.
- [52] Hêriş Golpîra and Erfan Babaei Tirkolaee. Stable maintenance task scheduling: A bi-objective robust optimization model. *Computers & Industrial Engineering*, 137:106007, 2019.
- [53] Prabhat Hajela and C-Y Lin. Genetic search strategies in multicriterion optimal design. *Structural Optimization*, 4(2):99–107, 1992.
- [54] Thomas Hanne. On the convergence of multiobjective evolutionary algorithms. *European Journal of Operational Research*, 117(3):553–564, 1999.
- [55] Michael Pilegaard Hansen and Andrzej Jaszkiewicz. *Evaluating the Quality of Approximations to the Non-Dominated Set*. IMM Technical Report, Department of Mathematical Modelling, Technical University of Denmark, 1998.
- [56] Edwin C Harrington. The desirability function. *Industrial Quality Control*, 21(10):494–498, 1965.
- [57] Willy Herroelen and Roel Leus. Project scheduling under uncertainty: Survey and research potentials. *European Journal of Operational Research*, 165(2):289–306, 2005.
- [58] Christina J Hopfe, Michael TM Emmerich, Robert Marijt, and Jan Hensen. Robust multi-criteria design optimisation in building design. *Proceedings of Building Simulation and Optimization, Loughborough, UK*, pages 118–125, 2012.

Bibliography

- [59] Jeffrey Horn, Nicholas Nafpliotis, and David E Goldberg. A niched Pareto genetic algorithm for multi-objective optimization. In *Proceedings of the First IEEE Conference on Evolutionary Computation. IEEE World Congress on Computational Intelligence*, pages 82–87. IEEE, 1994.
- [60] Kokolo Ikeda, Hajime Kita, and Shigenobu Kobayashi. Failure of Pareto-based moeas: Does non-dominated really mean near to optimal? In *Proceedings of the 2001 Congress on Evolutionary Computation (IEEE Cat. No. 01TH8546)*, volume 2, pages 957–962. IEEE, 2001.
- [61] Hisao Ishibuchi, Naoya Akedo, and Yusuke Nojima. Behavior of multiobjective evolutionary algorithms on many-objective knapsack problems. *IEEE Transactions on Evolutionary Computation*, 19(2):264–283, 2014.
- [62] Hisao Ishibuchi, Ryo Imada, Yu Setoguchi, and Yusuke Nojima. How to specify a reference point in hypervolume calculation for fair performance comparison. *Evolutionary Computation*, 26(3):411–440, 2018.
- [63] Andrew KS Jardine, Daming Lin, and Dragan Banjevic. A review on machinery diagnostics and prognostics implementing condition-based maintenance. *Mechanical Systems and Signal Processing*, 20(7):1483–1510, 2006.
- [64] Shouyong Jiang, Jinglei Guo, Bashar Alhnaity, and Qingyang Zhang. On analysis of irregular Pareto front shapes. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 15–25. Springer, 2021.
- [65] Yaochu Jin and Bernhard Sendhoff. Pareto-based multiobjective machine learning: An overview and case studies. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 38(3):397–415, 2008.
- [66] Nicolas Jozefowicz, Frédéric Semet, and El-Ghazali Talbi. Multi-objective vehicle routing problems. *European Journal of Operational Research*, 189(2):293–309, 2008.
- [67] Imed Kacem, Slim Hammadi, and Pierre Borne. Approach by localization and multiobjective evolutionary optimization for flexible job-shop scheduling problems. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 32(1):1–13, 2002.
- [68] Ibrahim Karahan and Murat Koksalan. A territory defining multiobjective evolutionary algorithms and preference incorporation. *IEEE Transactions on Evolutionary Computation*, 14(4):636–664, 2010.
- [69] Ahmed Khalafallah and Khaled El-Rayes. Automated multi-objective optimization system for airport site layouts. *Automation in Construction*, 20(4):313–320, 2011.
- [70] Frank Kursawe. A variant of evolution strategies for vector optimization. In *International Conference on Parallel Problem Solving from Nature*, pages 193–197. Springer, 1990.

- [71] Marco Laumanns, Lothar Thiele, Kalyanmoy Deb, and Eckart Zitzler. Combining convergence and diversity in evolutionary multiobjective optimization. *Evolutionary Computation*, 10(3):263–282, 2002.
- [72] Marco Laumanns, Eckart Zitzler, and Lothar Thiele. A unified model for multi-objective evolutionary algorithms with elitism. In *Proceedings of the 2000 Congress on Evolutionary Computation. CEC00 (Cat. No. 00TH8512)*, volume 1, pages 46–53. IEEE, 2000.
- [73] Longmei Li, Yali Wang, Heike Trautmann, Ning Jing, and Michael Emmerich. Multiobjective evolutionary algorithms based on target region preferences. *Swarm and Evolutionary Computation*, 40:196–215, 2018.
- [74] Lai-Yee Liu, Vitor Basto-Fernandes, Iryna Yevseyeva, Joost Kok, and Michael Emmerich. Indicator-based evolutionary level set approximation: Mixed mutation strategy and extended analysis. In *International Work-Conference on the Interplay Between Natural and Artificial Computation*, pages 146–159. Springer, 2017.
- [75] Yuan Liu, Ningbo Zhu, Kenli Li, Miqing Li, Jinhua Zheng, and Keqin Li. An angle dominance criterion for evolutionary many-objective optimization. *Information Sciences*, 509:376–399, 2020.
- [76] Christopher Mattson, Anoop Mullur, and Achille Messac. Minimal representation of multiobjective design space using a smart pareto filter. In *9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization*, page 5458, 2002.
- [77] Kaisa Miettinen. *Nonlinear Multiobjective Optimization*. Kluwer Academic Publishers, Boston, 1999.
- [78] SMJ Mirzapour Al-E-Hashem, Hooman Malekly, and Mir Bahador Aryanezhad. A multi-objective robust optimization model for multi-product multi-site aggregate production planning in a supply chain under uncertainty. *International Journal of Production Economics*, 134(1):28–42, 2011.
- [79] Kaname Narukawa, Yu Setoguchi, Yuki Tanigaki, Markus Olhofer, Bernhard Sendhoff, and Hisao Ishibuchi. Preference representation using gaussian functions on a hyperplane in evolutionary multi-objective optimization. *Soft Computing*, 20(7):2733–2757, 2016.
- [80] Vladimir D Noghin. Relative importance of criteria: a quantitative approach. *Journal of Multi-Criteria Decision Analysis*, 6(6):355–363, 1997.
- [81] Cemal Özgüven, Lale Özbakır, and Yasemin Yavuz. Mathematical models for job-shop scheduling problems with routing and process plan flexibility. *Applied Mathematical Modelling*, 34(6):1539–1548, 2010.

Bibliography

- [82] Ferdinando Pezzella, Gianluca Morganti, and Giampiero Ciaschetti. A genetic algorithm for the flexible job-shop scheduling problem. *Computers & Operations Research*, 35(10):3202–3212, 2008.
- [83] Michael James Pierro and William Roy Schneider. Vehicle maintenance management system and method, October 2001. US Patent 6,301,531.
- [84] Robin C Purshouse and Peter J Fleming. Evolutionary many-objective optimisation: An exploratory analysis. In *The 2003 Congress on Evolutionary Computation, 2003. CEC.*, volume 3, pages 2066–2073. IEEE, 2003.
- [85] Lily Rachmawati and Dipti Srinivasan. A multi-objective evolutionary algorithm with weighted-sum niching for convergence on knee regions. In *Proceedings of the 8th Annual Conference on Genetic and Evolutionary Computation*, pages 749–750, 2006.
- [86] Lily Rachmawati and Dipti Srinivasan. A multi-objective genetic algorithm with controllable convergence on knee regions. In *2006 IEEE International Conference on Evolutionary Computation*, pages 1916–1923. IEEE, 2006.
- [87] Lily Rachmawati and Dipti Srinivasan. Multiobjective evolutionary algorithm with controllable focus on the knees of the pareto front. *IEEE Transactions on Evolutionary Computation*, 13(4):810–824, 2009.
- [88] Cristian Ramirez-Atencia, Sanaz Mostaghim, and David Camacho. A knee point based evolutionary multi-objective optimization for mission planning problems. In *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 1216–1223, 2017.
- [89] Nery Riquelme, Christian Von Lüken, and Benjamin Baran. Performance metrics in multi-objective optimization. In *2015 Latin American Computing Conference (CLEI)*, pages 1–11. IEEE, 2015.
- [90] Hiroyuki Sato, Hernán Aguirre, and Kiyoshi Tanaka. Controlling dominance area of solutions in multiobjective evolutionary algorithms and performance analysis on multiobjective 0/1 knapsack problems. *IPSJ Digital Courier*, 3:703–718, 2007.
- [91] J David Schaffer. Multiple objective optimization with vector evaluated genetic algorithms. In *Proceedings of the First International Conference on Genetic Algorithms and their Applications*. Lawrence Erlbaum Associates. Inc., Publishers, 1985.
- [92] J David Schaffer. Some experiments in machine learning using vector evaluated genetic algorithms. Technical report, Vanderbilt Univ., Nashville, TN (USA), 1985.
- [93] Oliver Schütze, Marco Laumanns, and Carlos A Coello Coello. Approximating the knee of an mop with stochastic search algorithms. In *International Conference on Parallel Problem Solving from Nature*, pages 795–804. Springer, 2008.

-
- [94] Xiao-Ning Shen and Xin Yao. Mathematical modeling and multi-objective evolutionary algorithms applied to dynamic flexible job shop scheduling problems. *Information Sciences*, 298:198–224, 2015.
- [95] Pradyumn Kumar Shukla, Christian Hirsch, and Hartmut Schmeck. A framework for incorporating trade-off information using multi-objective evolutionary algorithms. In *International Conference on Parallel Problem Solving from Nature*, pages 131–140. Springer, 2010.
- [96] Pradyumn Kumar Shukla, Christian Hirsch, and Hartmut Schmeck. In search of equitable solutions using multi-objective evolutionary algorithms. In *International Conference on Parallel Problem Solving from Nature*, pages 687–696. Springer, 2010.
- [97] Kazimierz Sobczyk and BF Spencer Jr. *Random Fatigue: From Data to Theory*. Academic Press, 2012.
- [98] Zhiming Song, Xiaoyu Chen, Xin Luo, Maocai Wang, and Guangming Dai. Multi-objective optimization of agile satellite orbit design. *Advances in Space Research*, 62(11):3053–3064, 2018.
- [99] Nidamarthi Srinivas and Kalyanmoy Deb. Multiobjective optimization using nondominated sorting in genetic algorithms. *Evolutionary Computation*, 2(3):221–248, 1994.
- [100] Ronald Suich and George C Derringer. Is the regression equation adequate?: One criterion. *Technometrics*, pages 213–216, 1977.
- [101] Ma Guadalupe Castillo Tapia and Carlos A Coello Coello. Applications of multi-objective evolutionary algorithms in economics and finance: A survey. In *2007 IEEE Congress on Evolutionary Computation*, pages 532–539. IEEE, 2007.
- [102] Wannaporn Teekeng and Arit Thammano. Modified genetic algorithm for flexible job-shop scheduling problems. *Procedia Computer Science*, 12:122–128, 2012.
- [103] Lothar Thiele, Kaisa Miettinen, Pekka J Korhonen, and Julian Molina. A preference-based evolutionary algorithm for multi-objective optimization. *Evolutionary Computation*, 17(3):411–436, 2009.
- [104] Heike Trautmann, Tobias Wagner, and Dimo Brockhoff. R2-emoa: Focused multiobjective search using r2-indicator-based selection. In *International Conference on Learning and Intelligent Optimization*, pages 70–74. Springer, 2013.
- [105] Tamara Ulrich, Johannes Bader, and Lothar Thiele. Defining and optimizing indicator-based diversity measures in multiobjective search. In *International Conference on Parallel Problem Solving from Nature*, pages 707–717. Springer, 2010.
- [106] George J Vachtsevanos. *Intelligent Fault Diagnosis and Prognosis for Engineering Systems*, volume 456. Wiley Hoboken, 2006.

Bibliography

- [107] Pravin M Vaidya. An $o(n \log n)$ algorithm for the all-nearest-neighbors problem. *Discrete & Computational Geometry*, 4(2):101–115, 1989.
- [108] Eelke van der Horst, Patricia Marqués-Gallego, Thea Mulder-Krieger, Jacobus van Veldhoven, Johannes Kruisselbrink, Alexander Aleman, Michael TM Emmerich, Johannes Brussee, Andreas Bender, and Adriaan P IJzerman. Multi-objective evolutionary design of adenosine receptor ligands. *Journal of Chemical Information and Modeling*, 52(7):1713–1721, 2012.
- [109] Duc Van Nguyen, Steffen Limmer, Kaifeng Yang, Markus Olhofer, and Thomas Bäck. Modeling and prediction of remaining useful lifetime for maintenance scheduling optimization of a car fleet. *International Journal of Performability Engineering*, 15(9), 2019.
- [110] Bas van Stein, Hao Wang, and Thomas Bäck. Automatic configuration of deep neural networks with ego. *arXiv preprint arXiv:1810.05526*, 2018.
- [111] Yash Vesikar, Kalyanmoy Deb, and Julian Blank. Reference point based NSGA-III for preferred solutions. In *2018 IEEE Symposium Series on Computational Intelligence (SSCI)*, pages 1587–1594. IEEE, 2018.
- [112] Tobias Wagner and Heike Trautmann. Integration of preferences in hypervolume-based multiobjective evolutionary algorithms by means of desirability functions. *IEEE Transactions on Evolutionary Computation*, 14(5):688–701, 2010.
- [113] Xiaojuan Wang, Liang Gao, Chaoyong Zhang, and Xinyu Shao. A multi-objective genetic algorithm based on immune and entropy principle for flexible job-shop scheduling problem. *The International Journal of Advanced Manufacturing Technology*, 51(5-8):757–767, 2010.
- [114] Yali Wang, André Deutz, Thomas Bäck, and Michael Emmerich. Improving many-objective evolutionary algorithms by means of edge-rotated cones. In *International Conference on Parallel Problem Solving from Nature*, pages 313–326. Springer, 2020.
- [115] Yali Wang, André Deutz, Thomas Bäck, and Michael Emmerich. Edge-rotated cone orders in multi-objective evolutionary algorithms for improved convergence and preference articulation. In *2020 IEEE Symposium Series on Computational Intelligence (SSCI)*, pages 165–172, 2020.
- [116] Yali Wang, Michael Emmerich, André Deutz, and Thomas Bäck. Diversity-indicator based multi-objective evolutionary algorithm: DI-MOEA. In *International Conference on Evolutionary Multi-Criterion Optimization*, pages 346–358. Springer, 2019.
- [117] Yali Wang, Longmei Li, Kaifeng Yang, and Michael TM Emmerich. A new approach to target region based multiobjective evolutionary algorithms. In *2017 IEEE Congress on Evolutionary Computation (CEC)*, pages 1757–1764. IEEE, 2017.

- [118] Yali Wang, Steffen Limmer, Markus Olhofer, Michael Emmerich, and Thomas Bäck. Automatic preference based multi-objective evolutionary algorithm on vehicle fleet maintenance scheduling optimization. *Swarm and Evolutionary Computation*, page 100933, 2021.
- [119] Yali Wang, Steffen Limmer, Markus Olhofer, Michael TM Emmerich, and Thomas Bäck. Vehicle fleet maintenance scheduling optimization by multi-objective evolutionary algorithms. In *2019 IEEE Congress on Evolutionary Computation (CEC)*, pages 442–449. IEEE, 2019.
- [120] Yali Wang, Steffen Limmer, Duc Van Nguyen, Markus Olhofer, Thomas Bäck, and Michael Emmerich. Optimizing the maintenance schedule for a vehicle fleet: a simulation-based case study. *Engineering Optimization*, pages 1–14, 2021.
- [121] Yali Wang, Bas van Stein, Thomas Bäck, and Michael Emmerich. Improving NSGA-III for flexible job shop scheduling using automatic configuration, smart initialization and local search. In *Proceedings of the 2020 Genetic and Evolutionary Computation Conference Companion*, pages 181–182, 2020.
- [122] Yali Wang, Bas van Stein, Thomas Bäck, and Michael Emmerich. A tailored NSGA-III for multi-objective flexible job shop scheduling. In *2020 IEEE Symposium Series on Computational Intelligence (SSCI)*, pages 2746–2753. IEEE, 2020.
- [123] Wei Wei and Lihong Qiao. Multi-objective optimization design of complex mechanical and electrical products based on improved evolutionary algorithm. In *Advanced Materials Research*, volume 311, pages 1384–1388. Trans Tech Publications, 2011.
- [124] Simon Wessing. *Two-stage Methods for Multimodal Optimization*. PhD thesis, Universitätsbibliothek Dortmund, 2015.
- [125] Robin Winter, Floriane Montanari, Andreas Steffen, Hans Briem, Frank Noé, and Djork-Arné Clevert. Efficient multi-objective molecular optimization in a continuous latent space. *Chemical Science*, 10(34):8016–8024, 2019.
- [126] Emmanuel Xevi and Shahbaz Khan. A multi-objective optimization approach to water management. *Journal of Environmental Management*, 77(4):269–277, 2005.
- [127] Li-Ning Xing, Ying-Wu Chen, and Ke-Wei Yang. An efficient search method for multi-objective flexible job shop scheduling problems. *Journal of Intelligent manufacturing*, 20(3):283–293, 2009.
- [128] Guo Yu, Yaochu Jin, and Markus Olhofer. A method for a posteriori identification of knee points based on solution density. In *2018 IEEE Congress on Evolutionary Computation (CEC)*, pages 1–8. IEEE, 2018.

Bibliography

- [129] Lianfei Yu, Cheng Zhu, Jianmai Shi, and Weiming Zhang. An extended flexible job shop scheduling model for flight deck scheduling with priority, parallel operations, and sequence flexibility. *Scientific Programming*, 2017, 2017.
- [130] PL Yu and George Leitmann. Nondominated decisions and cone convexity in dynamic multicriteria decision problems. In *Multicriteria Decision Making and Differential Games*, pages 61–72. Springer, 1976.
- [131] Yuan Yuan and Hua Xu. Multiobjective flexible job shop scheduling using memetic algorithms. *IEEE Transactions on Automation Science and Engineering*, 12(1):336–353, 2013.
- [132] Chaoyong Zhang, Peigen Li, Yunqing Rao, and Shuxia Li. A new hybrid GA/SA algorithm for the job shop scheduling problem. In *European Conference on Evolutionary Computation in Combinatorial Optimization*, pages 246–259. Springer, 2005.
- [133] Chaoyong Zhang, Yunqing Rao, Peigen Li, and Xinyu Shao. Bilevel genetic algorithm for the flexible job-shop scheduling problem. *Chinese Journal of Mechanical Engineering*, 43(4):119–124, 2007.
- [134] Guohui Zhang, Liang Gao, and Yang Shi. An effective genetic algorithm for the flexible job-shop scheduling problem. *Expert Systems with Applications*, 38(4):3563–3573, 2011.
- [135] Qingfu Zhang and Hui Li. MOEA/D: A multiobjective evolutionary algorithm based on decomposition. *IEEE Transactions on Evolutionary Computation*, 11(6):712–731, 2007.
- [136] Qingfu Zhang, Aimin Zhou, Shizheng Zhao, Ponnuthurai Nagaratnam Suganthan, Wudong Liu, and Santosh Tiwari. Multiobjective optimization test instances for the CEC 2009 special session and competition. 2008.
- [137] Eckart Zitzler. *Evolutionary Algorithms for Multiobjective Optimization: Methods and Applications*, volume 63. Citeseer, 1999.
- [138] Eckart Zitzler, Joshua Knowles, and Lothar Thiele. Quality assessment of pareto set approximations. In *Multiobjective Optimization*, pages 373–404. Springer, 2008.
- [139] Eckart Zitzler and Simon Künzli. Indicator-based selection in multiobjective search. In *International Conference on Parallel Problem Solving from Nature*, pages 832–842. Springer, 2004.
- [140] Eckart Zitzler, Marco Laumanns, and Stefan Bleuler. A tutorial on evolutionary multiobjective optimization. In *Metaheuristics for Multiobjective Optimisation*, pages 3–37. Springer, 2004.

- [141] Eckart Zitzler and Lothar Thiele. Multiobjective optimization using evolutionary algorithms — a comparative case study. In Agoston E. Eiben, Thomas Bäck, Marc Schoenauer, and Hans-Paul Schwefel, editors, *Parallel Problem Solving from Nature — PPSN V*, pages 292–301, Berlin, Heidelberg, 1998. Springer Berlin Heidelberg.
- [142] Eckart Zitzler and Lothar Thiele. Multiobjective evolutionary algorithms: A comparative case study and the strength Pareto approach. *IEEE Transactions on Evolutionary Computation*, 3(4):257–271, 1999.

Bibliography
