

Peter Sudhölter
Professor
Department of Business and Economics
Microeconomics and Management Science
FAIRCARE
Postal address:
Campusvej 55
5230
Odense M
Denmark
Email: psu@sam.sdu.dk
Phone: 65502152
Web address: <http://www.sam.sdu.dk/~psu/PSU-homepage.htm>

Research Areas

Game Theory, Social Choice, Dynamic Programming, Decision Theory

Personal Information

Date of Birth: August 4, 1957
Place of Birth: Wuppertal, Germany
Marital Status: Married, three children

Academic Degrees

1983	Diploma (M.Sc.), Department of Mathematics, University of Bielefeld
1988	Dr. math. (Ph.D.), Department of Mathematics, University of Bielefeld
1994	Habilitation (2nd doctorate), Department of Economics, University of Bielefeld

Academic Appointments

University of Bielefeld, Institute of Mathematical Economics
1984 Scientific employee; 1985 – 1988 Scientific staff member; 1989 – 1993 Assistant; 1994 – 2001 'University docent'

Technical University of Chemnitz, Department of Mathematics
1995 (April – September) Visiting Professor (for Mathematical Economics)

The Hebrew University of Jerusalem, Center for Rationality
2000/2001 (November – August) Visiting Research Professor

SDU, Department of Business and Economics, COHERE
2001 – 2012 Associate Professor; 2013 – Full Professor

Other Professional Positions

2002 -	Member of the Editorial Board of the International Journal of Game Theory
2009 -	Member of the Editorial Board of Mathematical Methods of Operations Research
2009 -	Member of the board of trustees of the School of International Studies, Dresden
2012 -	Member of the Editorial Board of the International Game Theory Review

Supervision of Ph.D. Students

Department of Economics, University of Bielefeld	1995 Siegmart Moltzahn, 2000 Lutz Veldman, 2003 Sven Klauke and Christian Weiß, 2008 Evan Shellshear
--	--

Department of Mathematics,
Tsing Hua University,
Hsinchu, Taiwan

1998 Yan-An Hwang
SDU, Department of Business and
Economics

Publications

Hart–Mas-Colell consistency and the core in convex games

Dietzenbacher, B. & Sudhölter, P., Jun 2022, In: International Journal of Game Theory. 51, 2, p. 413-429

Characterization of TU games with stable cores by nested balancedness

Grabisch, M. & Sudhölter, P., 29. Oct 2021, (E-pub ahead of print) In: Mathematical Programming. 26 p.

Axiomatizations of Dutta-Ray's egalitarian solution on the domain of convex games

Calleja, P., Llerena, F. & Sudhölter, P., Aug 2021, In: Journal of Mathematical Economics. 95, 10 p., 102477.

Constrained welfare egalitarianism in surplus-sharing problems

Calleja, P., Llerena, F. & Sudhölter, P., Jan 2021, In: Mathematical Social Sciences. 109, January, p. 45-51

Consistency, anonymity, and the core on the domain of convex games

Hokari, T., Funaki, Y. & Sudhölter, P., Dec 2020, In: Review of Economic Design. 24, 3-4, p. 187-197

Monotonicity and Weighted Prenucleoli: A Characterization without Consistency

Calleja, P., Llerena, F. & Sudholter, P., Aug 2020, In: Mathematics of Operations Research. 45, 3, p. 1056-1068

Generic finiteness of equilibrium distributions for bimatrix outcome game forms

Litan, C., Marhuenda, F. & Sudhölter, P., 2020, In: Annals of Operations Research. 287, 2, p. 801-810

Professor Bezalel Peleg (1936-2019)

Peters, H. & Sudholter, P., 5. Jul 2019, In: Social Choice and Welfare. 53, 2, p. 175-177

Preface to the Special Issue on Game Theory and Economic Applications

Platz, T. T., Sudhölter, P., Zarzuelo, J. M. & Østerdal, L. P., 1. Sep 2018, In: International Game Theory Review. 20, 3, 2 p., 1802001.

On a class of vertices of the core

Grabisch, M. & Sudhölter, P., 1. Mar 2018, In: Games and Economic Behavior. 108, March, p. 541-557

Decomposing bivariate dominance for social welfare comparisons

Marling, T. G., Range, T. M., Sudhölter, P. & Østerdal, L. P., 2018, In: Mathematical Social Sciences. 95, p. 1-8

Characterizations of highway toll pricing methods

Sudhölter, P. & Zarzuelo, J. M., 1. Jul 2017, In: European Journal of Operational Research. 260, 1, p. 161-170

Axiomatizations of symmetrically weighted solutions

Kleppe, J., Reijnierse, H. & Sudhölter, P., 1. Aug 2016, In: Annals of Operations Research. 243, 1-2, p. 37-53

Comments on: Remarkable polyhedra related to set functions, games and capacities

Sudhölter, P., 1. Jul 2016, In: TOP. 24, p. 333-334

Characterizations of solutions for games with precedence constraints

Grabisch, M. & Sudhölter, P., 1. Mar 2016, In: International Journal of Game Theory. 45, 1-2, p. 269-290

Characterizations of the core of TU and NTU games with communication structures

Albizuri, J. M. & Sudhölter, P., 2016, In: Social Choice and Welfare. 46, 2, p. 451-475

Determinacy of equilibrium in outcome game forms

Litan, C., Marhuenda, F. & Sudhölter, P., Oct 2015, In: Journal of Mathematical Economics. 60, p. 28-32

On bargaining sets of convex NTU games

Peleg, B. & Sudhölter, P., 2015, In: International Game Theory Review. 17, 4, 7 p., 1550008 .

On the restricted cores and the bounded core of games on distributive lattices

Grabisch, M. & Sudhölter, P., 16. Jun 2014, In: European Journal of Operational Research. 235, 3, p. 709-717

On extensions of the core and the anticore of transferable utility games

Derks, J., Peters, H. & Sudhölter, P., 2014, In: International Journal of Game Theory. 43, 1, p. 37-63

The prenucleolus and the prekernel for games with communication structures

Khmelnitskaya, A. & Sudhölter, P., 1. Jul 2013, In: Mathematical Methods of Operations Research. 78, 2, p. 285-299

Axiomatizations of symmetrically weighted solutions

Kleppe, J., Reijnierse, H. & Sudhölter, P., 2013, In: CentER Discussion Paper Series. 2013-007, 19 p.

Extending the Nash solution to choice problems with reference points

Sudhölter, P. & Zarzuelo, J. M., 2013, In: Games and Economic Behavior. 80, p. 219-228

Nonsymmetric variants of the prekernel and the prenucleolus

Orshan, G. & Sudhölter, P., Dec 2012, In: International Journal of Game Theory. 41, 4, p. 809–828

The bounded core for games with precedence constraints

Grabisch, M. & Sudhölter, P., Dec 2012, In: Annals of Operations Research. 201, 1, p. 251–264 14 p.

Sequential legislative lobbying

Le Breton, M., Sudhölter, P. & Zaporozhets, V., Jul 2012, In: Social Choice and Welfare. 39, 2-3, p. 491–520

On the impact of independence of irrelevant alternatives: the case of two-person NTU games

Peleg, B., Sudhölter, P. & Zarzuelo, J. M., Mar 2012, In: SERIEs: Journal of the Spanish Economic Association. 3, 1-2, p. 143-156

Bezalel Peleg: a bibliography

Peters, H. & Sudhölter, P., 2012, In: International Journal of Game Theory. 41, 4, p. 915–930 16 p.

The positive core of a cooperative game

Orshan, G. & Sudhölter, P., 2010, In: International Journal of Game Theory. 39, 1-2, p. 113-136 24 p.

On core stability, vital coalitions, and extendability

Shellshear, E. & Sudhölter, P., 1. Nov 2009, In: Games and Economic Behavior. 67, 2, p. 633-644

Bargaining sets of majority voting games

Holzman, R., Peleg, B. & Sudhölter, P., 1. Nov 2007, In: Mathematics of Operations Research. 32, 4, p. 857–872

The Shapley value of exact assignment games

Hoffmann, M. & Sudhölter, P., 1. Apr 2007, In: International Journal of Game Theory. 35, 4, p. 557-568 12 p.

Introduction to the theory of cooperative games

Peleg, B. & Sudhölter, P., 2007, 2 ed. Berlin, Heidelberg, New York: Springer Science+Business Media. 328 p. (Theory and Decision Library Series C, Vol. 34).

On assignment games

Raghavan, T. E. S. & Sudhölter, P., 2006, *Advances in Dynamic Games: Applications to Economics, Management Science, Engineering, and Environmental Management*. Haurie, A., Muto, S., Petrosjan, L. A. & Raghavan, T. E. S. (eds.). Birkhäuser Verlag, p. 179-193 (Annals of the International Society of Dynamic Games, Vol. 8).

On bargaining sets and voting games

Peleg, B. & Sudhölter, P., 2005, *Proceedings of the 4th Twente Workshop on Cooperative Games joint with the 3rd Dutch-Russian Symposium*. Driessen, T. S. H., Khmel'nitskaya, A. B. & Timmer, J. B. (eds.). p. 89-104

On the non-emptiness of the Mas-Colell bargaining set

Peleg, B. & Sudhölter, P., 2005, In: Journal of Mathematical Economics. 41, 8, p. 1060-1068

The modiclus and core stability

Raghavan, T. E. S. & Sudhölter, P., 2005, In: International Journal of Game Theory. 33, 4, p. 467-478

The Shapley value of exact assignment games

Hoffmann, M. & Sudhölter, P., 2005, DP 4, Department of Economics.

Bargaining sets of voting games

Peleg, B. & Sudhölter, P., 2004, Discussion Paper 376, Center for Rationality, The Hebrew University of Jerusalem, 22 p.

Cartels via the modiclus

Rosenmüller, J. & Sudhölter, P., 2004, In: Discrete Applied Mathematics. 134, 1-3, p. 263-302

Introduction to the Theory of Cooperative Games

Peleg, B. & Sudhölter, P., 2003, Dordrecht: Kluwer Academic Publishers.

Reconfirming the Prenucleolus

Orshan, G. & Sudhölter, P., 2003, In: Mathematics of Operations Research. 28, p. 283-293

A note on an axiomatization of the core of market games

Sudhölter, P. & B. Peleg, B., 2002, In: Mathematics of Operations Research. 27, p. 441-444

Equal treatment for both sides of assignment games in the modified least core

Sudhölter, P., 2002, In: Homo Oeconomicus. 19, 3, p. 413-437

Formation of cartels in glove markets and the modiclus

Rosenmüller, J. & Sudhölter, P., 2002, In: Journal of Economics. 76, p. 217-246

The dummy paradox of the bargaining set

Peleg, B. & Sudhölter, P., 2002, *Game Theory and Application*, 8. L.A. Petrosjan, L. A. & V.V. Mazalov (eds.). p. 119-124

The dummy paradox of the bargaining set

Peleg, B. & Sudhölter, P., 2002, In: International Journal of Mathematics, Game Theory and Algebra. 12, p. 443-446

Axiomatizations of the core on the universal domain and other natural domains

Hwang, Y-A. & Sudhölter, P., 2001, In: *International Journal of Game Theory*. 29, p. 597-623

Equal Treatment for Both Sides of Assignment Games in the Modified Least Core

Sudhölter, P., 2001, *Power Indices and Coalition Formation*. Holler, M. J. & Owen, G. (eds.). Boston/Dordrecht/London: Springer Science+Business Media, Vol. 2. p. 175-202

The Semireactive Bargaining Set of a Cooperative Game

Sudhölter, P. & Potters, J., 2001, In: *International Journal of Game Theory*. 30, p. 117-139

Erratum: Nucleoli as maximizers of collective satisfaction functions

Sudhölter, P. & Peleg, B., 2000, In: *Social Choice and Welfare*. 17, 2, p. 379-380

The canonical extensive form of a game form: Part II – Representation

Sudhölter, P., Rosenmüller, J. & Peleg, B., 2000, In: *Journal of Mathematical Economics*. 33, 3, p. 299-338

The positive prekernel of a cooperative game

Sudhölter, P. & Peleg, B., 2000, In: *International Game Theory Review*. 2, 4, p. 287-305

Airport problems and consistent allocation rules

Potters, J. & Sudhölter, P., 1999, In: *Mathematical Social Sciences*. 38, 1, p. 83-102

Single-peakedness and coalition-proofness

Peleg, B. & Sudhölter, P., 1999, In: *Review of Economic Design*. 4, p. 381-387

The canonical extensive form of a game form: Part I – Symmetries

Peleg, B., Rosenmüller, J. & Sudhölter, P., 1999, *Current Trends in Economics: Theory and Applications*. Alkan, A., Aliprantis, C. D. & Yannelis, N. C. (eds.). p. 367-387 (Studies in Economic Theory, Vol. 8).

Axiomatizations of game theoretical solutions for one-output cost sharing problems

Sudhölter, P., 1998, In: *Games and Economic Behavior*. 24, 1-2, p. 142-171

Nucleoli as maximizers of collective satisfaction functions

Sudhölter, P. & Peleg, B., 1998, In: *Social Choice and Welfare*. 15, 3, p. 383-411

An axiomatization of Nash equilibria in economic situations

Peleg, B. & Sudhölter, P., 1997, In: *Games and Economic Behavior*. 18, 2, p. 277-285

Nonlinear self dual solutions for TU games

Sudhölter, P., 1997, *Game Theoretical Applications to Economics and Operations Research*. Parthasarathy, T., Dutta, B., Potters, J. A. M., Raghavan, T. E. S., Ray, D. & Sen, A. (eds.). Kluwer Academic Publishers, p. 33-50 (Theory and Decision Library Series C, Vol. 18).

The modified nucleolus: Properties and axiomatizations

Sudhölter, P., 1997, In: *International Journal of Game Theory*. 26, p. 147-182

Star-shapedness of the kernel for homogeneous games

Sudhölter, P., 1996, In: *Mathematical Social Sciences*. 32, 3, p. 179-214

The modified nucleolus as canonical representation of weighted majority games

Sudhölter, P., 1996, In: *Mathematics of Operations Research*. 21, 3, p. 734-756

Directed and weighted majority games

Krohn, I. & Sudhölter, P., 1995, In: Zeitschrift für Operations Research. 42, p. 189-216

Solution concepts for C-convex, assignment, and M2-games

Sudhölter, P., 1994, Bielefeld: Institute of Economics, University of Bielefeld, 28 p. (Working Paper. Institute of Economics, University of Bielefeld, Vol. 232).

The kernel of homogeneous games with steps

Peleg, B., Rosenmüller, J. & Sudhölter, P., 1994, *Essays in Game Theory: In Honor of Michael Maschler*. Megiddo, N. (ed.). Springer, p. 163-192

The nucleolus of homogeneous games with steps

Rosenmüller, J. & Sudhölter, P., 1994, In: Discrete Applied Mathematics. 50, 1, p. 53-76

Independence for characterizing axioms of the pre-nucleolus

Sudhölter, P., 1993, Working Paper 220, Institute of Mathematical Economics, University of Bielefeld, 12 p.

Implementing the modified LH-algorithm

Krohn, I., Moltzahn, S., Rosenmüller, J., Sudhölter, P. & Wallmeier, H-M., 1991, In: Applied Mathematics and Computation. 45, p. 31-72

Homogeneous games as anti step functions

Sudhölter, P., 1989, In: International Journal of Game Theory. 18, p. 433-469

Construction of homogeneous zero-sum games

Sudhölter, P., 1986, Working Paper 144, Institute of Mathematical Economics, University of Bielefeld, 43 p.

Activities

11th Triennial Conference of Association of Asia Pacific Operational Research Societies

Peter Sudhölter (Chairman)

6. Aug 2018 → 9. Aug 2018

12th European Meeting on Game Theory (SING12)

Peter Sudhölter (Organizer)

11. Jul 2016 → 13. Jul 2016

19th Conference of the Society for the Advancement of Economic Theory

Peter Sudhölter (Participant)

30. Jun 2019 → 4. Jul 2019

20th Conference of the Society for the Advancement of Economic Theory

Peter Sudhölter (Participant)

15. Jun 2021

30th European Conference on Operational Research

Peter Sudhölter (Participant)

23. Jun 2019 → 26. Jun 2019

31st European Conference on Operational Research

Peter Sudhölter (Participant)

13. Jul 2021

3rd Workshop on Cooperative Game Theory in Business Practice

Peter Sudhölter (Participant)
16. Jun 2016 → 17. Jun 2016

5th World Congress of the Game Theory Society

Peter Sudhölter (Organizer)
24. Jul 2016 → 26. Jul 2016

6th World Congress of the Game Theory Society

Peter Sudhölter (Participant)
22. Jul 2021

7th Game Theory, Economics and Mathematics Workshop

Peter Sudhölter (Organizer) & Rafael Treibich (Organizer)
5. Oct 2018 → 6. Oct 2018

Associate editor of International Game Theory Review (Journal)

Peter Sudhölter (Editor)
1. Jan 2012 → ...

Associate editor of International Journal of Game Theory (Journal)

Peter Sudhölter (Editor)
15. Mar 2002 → ...

Associate editor of International Journal of Game Theory (Journal)

Peter Sudhölter (Peer reviewer)
2002 → ...

Associate editor of Mathematical Methods of Operations Research (Journal)

Peter Sudhölter (Editor)
1. Oct 2009 → ...

Associate editor of Mathematical Methods of Operations Research (Journal)

Peter Sudhölter (Peer reviewer)
2009 → ...

Axiomatizations in Game Theory

Peter Sudhölter (Participant)
1. Sep 2017 → 2. Sep 2017

Axiomatizations of symmetrically weighted solutions

Peter Sudhölter (Speaker)
9. Jul 2013

Axiomatizations of the core of games with communication structures

Peter Sudhölter (Speaker)
8. Jul 2014

Board of trustees, School of International Studies, Dresden (External organisation)

Peter Sudhölter (Member)
2009

Characterization of solutions of highway cost sharing problems

Peter Sudhölter (Speaker)

9. Jul 2015

Characterization of solutions of highway cost sharing problems

Peter Sudhölter (Speaker)

12. Jul 2015

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

29. Jun 2017

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

6. Jul 2017

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Lecturer)

Dec 2016

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Lecturer)

Oct 2017

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Lecturer)

Nov 2017

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

19. Nov 2019

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

30. Jan 2020

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

13. Jul 2021

Characterization of TU games with stable cores by nested balancedness

Peter Sudhölter (Speaker)

15. Jun 2021

Characterizations of solutions to highway cost allocation problems

Peter Sudhölter (Speaker)

25. Jul 2016

Characterizing the core on various domains of cooperative games

Peter Sudhölter (Speaker)

16. Apr 2019

Consistency and the core of games with communication structures

Peter Sudhölter (Lecturer)

Apr 2014

Consistency, anonymity, and the core on the domain of convex games

Peter Sudhölter (Speaker)

22. Jul 2021

Department of Economics (Organisational unit)

Peter Sudhölter (Member)

2013 → ...

DGPE PhD course "Markov Decision Processes and Stochastic Games"

Peter Sudhölter (Organizer)

5. Jul 2016 → 8. Jul 2016

Discussion Papers on Business and Economics (Journal)

Peter Sudhölter (Editor)

2009 → ...

Editorial Board, International Game Theory Review (External organisation)

Peter Sudhölter (Member)

2012 → ...

Editorial Board, International Journal of Game Theory (External organisation)

Peter Sudhölter (Member)

2002 → ...

Editorial Board, International Journal of Game Theory (External organisation)

Peter Sudhölter (Member)

2002 → ...

Editorial Board, Mathematical Methods of Operations Research (External organisation)

Peter Sudhölter (Member)

2009 → ...

Editorial Board, Mathematical Methods of Operations Research (External organisation)

Peter Sudhölter (Member)

2009 → ...

Egalitarianism in surplus-sharing problems and the Dutta-Ray solution

Peter Sudhölter (Speaker)

25. Jun 2019

Game Theory - Economics and Mathematics 2 (GEM2)

Peter Sudhölter (Organizer)

15. Jun 2013 → 16. Jun 2013

Game Theory - Economics and Mathematics 2019

Andrés Salamanca (Organizer), Lone Grønbaek (Organizer), Peter Sudhölter (Organizer) & Rafael Treibich (Organizer)

2019

Game Theory - Economics and Mathematics 2019

Andrés Salamanca (Participant), Peter Sudhölter (Participant), Rafael Treibich (Participant) & Lone Grønbaek (Participant)

Jul 2019 → Oct 2019

Game Theory - Economics and Mathematics 3 (GEM3)

Peter Sudhölter (Organizer)

2. Oct 2014 → 3. Oct 2014

Game Theory - Economics and Mathematics 4 (GEM4)

Peter Sudhölter (Organizer)

1. Oct 2015

Game Theory - Economics and Mathematics 5 (GEM5)

Peter Sudhölter (Organizer)

11. Jul 2016 → 13. Jul 2016

Game Theory - Economics and Mathematics 6 (GEM6)

Peter Sudhölter (Organizer)

7. Jun 2017

Game Theory Society (External organisation)

Peter Sudhölter (Member)

2000 → ...

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

Jul 2013

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

Mar 2014 → Apr 2014

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

Apr 2016

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

Apr 2017

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

Jul 2017

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

22. Apr 2018 → 30. Apr 2018

IAE, Université de Paris I Panthéon-Sorbonne

Peter Sudhölter (Visiting researcher)

7. Apr 2019 → 21. Apr 2019

Monotonicity and weighted nucleoli: A characterization without consistency

Peter Sudhölter (Speaker)

10. Jul 2018

Monotonicity and weighted nucleoli: A characterization without consistency

Peter Sudhölter (Speaker)

7. Aug 2018

On a class of vertices of the core

Peter Sudhölter (Lecturer)
Dec 2016

On bargaining sets of convex NTU games

Peter Sudhölter (Speaker)
24. Jun 2015

On bargaining sets of convex NTU games

Peter Sudhölter (Speaker)
30. Jul 2015

On symmetrically weighted prenucleoli, equal surplus division, and reduced game properties

Peter Sudhölter (Lecturer)
Nov 2017

On the core, prekernel, and prenucleolus of games with communication structures

Peter Sudhölter (Speaker)
25. Aug 2015

On the generic finiteness of equilibrium outcome distributions in game forms

Peter Sudhölter (Lecturer)
Apr 2013

PhD assessment committee - Andrés Salamanca Lugo (Event)

Peter Sudhölter (Member)
12. Nov 2016

PhD assessment committee - Stéphane Gonzalez (Event)

Peter Sudhölter (Member)
30. Jun 2016

The bilateral consistent prekernel for balanced NTU games and resulting ordinal solutions for economic environments

Peter Sudhölter (Speaker)
25. Jul 2013

The Hebrew University of Jerusalem

Peter Sudhölter (Visiting researcher)
Dec 2016

The prenucleolus and the prekernel for games with communication structures

Peter Sudhölter (Speaker)
9. Nov 2012

Universities of Reus and Barcelona

Peter Sudhölter (Visiting researcher)
Nov 2017

University of the Basque Country

Peter Sudhölter (Visiting researcher)
Jul 2013 → ...

University of the Basque Country
Peter Sudhölter (Visiting researcher)
Dec 2015

University of the Basque Country
Peter Sudhölter (Visiting researcher)
10. Jul 2017 → 9. Jan 2018

University of Vigo
Peter Sudhölter (Visiting researcher)
Oct 2017

Welfare egalitarianism in surplus-sharing problems and convex games
Peter Sudhölter (Speaker)
1. Jul 2019

Welfare egalitarianism in surplus-sharing problems and convex games
Peter Sudhölter (Speaker)
9. Jul 2019

Welfare egalitarianism in surplus-sharing problems and convex games
Peter Sudhölter (Speaker)
12. Apr 2019