

Mahadi DDAMULIRA

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Personal Information

Born 08.10.1989, Masaka, Uganda.

Married, two children, **Caysan** (born 22.12.2018) and **Kaira** (born 24.09.2020).

Education Background

2016 – 2020 **PhD (Dr.rer.nat.) in Mathematics**, Institute of Analysis and Number Theory, Graz University of Technology (TU Graz), Graz, Austria (Pass with Distinction).

Thesis *Diophantine Equations and Linearly Recurrent Sequences* [PDF] (Defended 05.06.2020)

Supervisor Prof. Dr. Robert Tichy; TU Graz, Graz, Austria.

2015 – 2016 **Postgraduate Diploma in Mathematics**, The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy.

Thesis *The Algorithmic Solution of Diophantine Equations* [PDF] (Defended 20.08.2016)

Supervisor Prof. Dr. Fernando Rodriguez Villegas; ICTP, Trieste, Italy.

2014 – 2015 **Master of Science in Mathematical Sciences**, African Institute for Mathematical Sciences (AIMS) Ghana, Birwa, Ghana, affiliated to the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana (Pass with Distinction).

Thesis *Diophantine Equations with Fibonacci and Pell Numbers* [PDF] (Defended 05.06.2015)

Supervisor Prof. Dr. Florian Luca; University of the Witwatersrand, Johannesburg, South Africa.

2009 – 2012 **Bachelor of Science with Education (Mathematics, Physics, and Education)**, Makerere University, Kampala, Uganda (First Class Honours).

2007 – 2008 **Uganda Advanced Certificate of Education**, Bweyogerere Sec. School, Kampala.

2003 – 2006 **Uganda Certificate of Education**, Kyotera Town School, Kyotera, Uganda.

1996 – 2002 **Primary Leaving Examinations**, Kyotera Primary School, Kyotera, Uganda.

Short Courses and Online Courses

2014 – 2015 **Online Course in Complex Analysis (4 ETCS)**, Faculty of Mathematics, Technische Universität Chemnitz (TU Chemnitz), Chemnitz, Germany (Awarded 09.06.2015).

Teaching and Research Interests

I am a mathematician whose research interests lie at the interface between pure and applied mathematics. I am currently interested in number theory, more specifically working on topics from Diophantine equations which involve linearly recurrent sequences such as the Fibonacci numbers, Pell numbers, Lucas numbers, Tribonacci numbers, Padovan numbers, and the k -generalized Fibonacci numbers. The methods of approach to such equations heavily rely on the Baker's theory for linear forms in logarithms of algebraic numbers as well as the Baker-Davenport reduction procedure. Computations are done with the help of computer programs in Sage, Python, Matlab, Maple, and Mathematica.

Employment, Teaching, and Research Experience

- 2021 – Date **Lecturer**, Department of Mathematics, Makerere University, Kampala [UG].
2020 – 2021 **Postdoctoral Researcher**, MPI-SWS, Kaiserslautern & Saarbrücken [DE].
2020 – 2020 **University Project Assistant (Postdoc)**, Analysis & Number Theory, TU Graz [AT].
2016 – 2020 **University Project Assistant (Praedoc)**, Analysis & Number Theory, TU Graz [AT].
2012 – 2014 **Mathematics and Physics Teacher**, Mariam High School, Kisaasi–Kampala [UG].
2012 – 2014 **Mathematics and Physics Teacher**, Bweyogerere Secondary School, Kampala [UG].

Courses Taught

- Mak Univ MTH1101 Calculus I, MTH1103 Foundations of Mathematics, MTH2201 Abstract Algebra, MTH3214 Number Theory (Undergraduate).
Mak Univ MTH7104 Integration Theory, MTH7213 Algebraic Number Theory, MTH7218 Analytic Number Theory, MTA7114 Fundamentals of Probability and Statistics (Postgraduate).

Student Supervision

Completed

1. Herbert Batte (2019/HD13/993U) – M.Sc. (Mathematics), Makerere University. Thesis Title: **Solutions to a non-linear Diophantine equation of Pillai type**, May 2022.

On-going

2. Herbert Batte (2021/HD13/24358U) – Ph.D. (Mathematics), Makerere University. Thesis Title: **Solutions to Diophantine equations involving terms of Lucas sequences, Perfect powers and Repdigits**, Developing a Research Proposal.
3. Valentine Okiru (2021/HD13/2577U) – M.Sc. (Mathematics), Makerere University. Thesis Title: **Multiplicative independence of the roots of generalized Fibonacci and Pell polynomials**, Developing a Research Proposal.

Publications and Preprints

Publications [Peer reviewed]

1. **M. Ddamulira**, F. Luca, and M. Rakotomalala, *Fibonacci numbers which are products of two Pell numbers*, Fibonacci Quart. **54** (2016), No.1, 11–18. MR3473255, Zbl1400.11040, Link.
2. **M. Ddamulira**, F. Luca, and M. Rakotomalala, *On a problem of Pillai with Fibonacci numbers and powers of 2*, Proc. Indian Acad. Sci. (Math. Sci.) **127** (2017), No.3, 411–421. MR3660342, Zbl1421.11017, DOI.
3. **M. Ddamulira**, C. A. Gómez, and F. Luca, *On a problem of Pillai with k -generalized Fibonacci numbers and powers of 2*, Monatsh. Math. **187** (2018), No.4, 635–664. MR3861322, Zbl1437.11051, DOI.
4. **M. Ddamulira**, *On the problem of Pillai with Tribonacci numbers and powers of 3*, J. Integer Seq. **22** (2019), No.5, 14 pp, Article 19.5.6. MR4008154, Zbl07114878, Link.
5. **M. Ddamulira**, *On the problem of Pillai with Padovan numbers and powers of 3*, Stud. Sci. Math. Hungar. **56** (2019), No.3, 364–379. MR4020341, Zbl1438.11034, DOI.
6. **M. Ddamulira** and F. Luca, *On the x -coordinates of Pell equations which are k -generalized Fibonacci numbers*, J. Number Theory **207** (2020), 156–195. MR4017944, Zbl07118782, DOI.
7. **M. Ddamulira**, *On the x -coordinates of Pell equations that are products of two Lucas numbers*, Fibonacci Quart. **58** (2020), No.1, 18–37. MR4069678, Zbl07240183, Link.

8. **M. Ddamulira**, *Diophantine Equations and Linearly Recurrent Sequences*, PhD Thesis, Graz University of Technology - Austria (2020), 1–182, ISBN: 979-8662-39876-4. MR4132436, ProQuest LLC, Link.
9. **M. Ddamulira**, *Repdigits as sums of three balancing numbers*, Math. Slovaca **70** (2020), No.3, 557–566. MR4104345, Zbl07289661, DOI.
10. **M. Ddamulira**, *Repdigits as sums of three Padovan numbers*, Bol. Soc. Mat. Mex. (3) **26** (2020), No.2, 247–261. MR4110448, Zbl07211802, DOI.
11. **M. Ddamulira**, *On a problem of Pillai with Fibonacci numbers and powers of 3*, Bol. Soc. Mat. Mex. (3) **26** (2020), No.2, 263–277. MR4110449, Zbl07211803, DOI.
12. **M. Ddamulira** and F. Luca, *On the problem of Pillai with k -generalized Fibonacci numbers and powers of 3*, Int. J. Number Theory **16** (2020), No.7, 1643–1666. MR4132045, Zbl07232845, DOI.
13. **M. Ddamulira**, *On the x -coordinates of Pell equations that are products of two Padovan numbers*, Integers **20** (2020), Art. No. A70, 20 pp. MR4142507, Zbl, Link
14. **M. Ddamulira**, *Tribonacci numbers that are concatenations of two repdigits*, Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM **114** (2020), No.4, Art. No. 203, 10 pp. MR4151771, Zbl07262208, DOI.
15. **M. Ddamulira** and F. Luca, *The x -coordinates of Pell equations and sums of two Fibonacci numbers II*, Proc. Indian Acad. Sci. (Math. Sci.) **130** (2020), No.1, Art. No.58, 21 pp. MR4156322, Zbl07271355, DOI.
16. **M. Ddamulira**, *On the x -coordinates of Pell equations that are sums of two Padovan numbers*. Bol. Soc. Mat. Mex. (3) **27** (2021), No.1, Art. No.4, 23 pp. MR4219361, Zbl07342824, DOI.
17. **M. Ddamulira**, *Padovan numbers that are concatenations of two distinct repdigits*. Math. Slovaca **71** (2021), No.2, 275–284. MR4243626, Zbl07438341, DOI.
18. T. P. Chalebgwa and **M. Ddamulira**, *Padovan numbers which are palindromic concatenations of two distinct repdigits*. Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM **115** (2021), No.3, Art. No. 108, 14 pp. MR4249964, Zbl07358923, DOI.
19. **M. Ddamulira** and F. Luca, *On the exponential Diophantine equation related to powers of two consecutive terms of Lucas sequences*, Ramanujan J. **56** (2021), No.2, 651–684. MR4325998, Zbl07434820, DOI.
20. **M. Ddamulira**, F. Luca, and R. Tichy, *On the Shorey–Tijdeman Diophantine equation involving terms of Lucas sequences*, Indag. Math. (N.S.) **33** (2021), No.2, 314–321. MR4383112, Zbl07478442, DOI.
21. H. Batte, T. P. Chalebgwa, and **M. Ddamulira**, *Perrin numbers that are concatenations of two repdigits.*, Arab. J. Math. **11** (2022), No.3, 469–478. MR4502865, Zbl 07610698, DOI.

Accepted manuscripts [Peer reviewed]

22. H. Batte, **M. Ddamulira**, J. Kasozi, and F. Luca, *On the multiplicity in Pillai's problem with Fibonacci numbers and powers of a fixed prime. (Accepted to appear in Glasnik Matematički).*

Preprints

- **M. Ddamulira** and F. Luca, *On the x -coordinates of Pell equations which are products of two Pell numbers. (Submitted for review).*

Schools, Workshops, and Conferences

- Nominated to serve as **Team Leader Uganda** at the *63rd International Mathematical Olympiad* to take place at the University of Oslo, Norway from 6th to 16th July 2022.
- Invited to attend the *8th Heidelberg Laureate Forum* to take place in Heidelberg, Germany from 19th to 24th September 2021.
- *Semester workshop on Illustrating Number Theory and Algebra* held at ICERM, Brown University, Providence, RI, USA from 21st to 25th October 2019.
- *The fifth mini symposium of the Roman Number Theory Association* held at Università Roma Tre, Rome, Italy from 10th to 12th April 2019.
- *Mini-Symposium on Analytic Number Theory and Applications* held at Johannes Kepler Universität Linz , Linz, Austria on 1st April 2019.
- *Number Theory and Dynamics Conference* held at the Centre for Mathematics, University of Cambridge, Cambridge, United Kingdom from 25th to 29th March 2019.
- *Workshop and Winter School on Local Statistics of Point Sequences* held at Johannes Kepler Universität Linz , Linz, Austria from 25th February to 1st March 2019.
- *Special Semester on Multivariate Algorithms and their Foundations in Number Theory - Workshop 3 (Discrepancy)* held at the Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria from 26th to 30th November 2018.
- *Conference on Diophantine m -tuples and Related Problems II* held at Purdue University Northwest, Westville/Hammond, Indiana, USA from 15th to 17th October 2018.
- *Conference on Diophantine Approximation and Transcendence* held at the Centre International de Rencontres Mathématiques (CIRM) - Luminy, Marseille, France from 10th to 14th September 2018.
- *Conference on Elementary and Analytic Number Theory (ELAZ)* held at the Max Plank Institute for Mathematics (MPIM), Bonn, Germany from 3rd to 7th September 2018.
- *Summer School in Dynamics (smr 3226)* held at the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy from 16th to 27th July 2018.
- *Symposium Diskrete Mathematik 2018* held at the Institute of Discrete Mathematics, Graz University of Technology, Graz, Austria from 15th to 16th June 2018.
- *Cooperation Workshop for the FWF Special Reserch Program (SFB) “Quasi-Monte Carlo Methods: Theory and Applications” (QMC)* held at the Johannes Kepler Universität Linz (JKU), Linz, Austria from 19th to 20th April 2018.
- *A CIMPA Research School on Explicit Number Theory* held at the School of Mathematics, University of the Witwatersrand, Johannesburg, South Africa from 8th to 19th January 2018.
- *ESI Program On Tractability of High Dimensional Problems & Discrepancy* held at The Erwin Schrödinger International Institute for Mathematics and Physics, University of Vienna, Vienna, Austria from 11th September to 13th October 2017.
- *Journées Algophantiennes Bordelaises 2017* held at the Institut de Mathématiques de Bordeaux, Université de Bordeaux, Bordeaux, France from 7th to 9th June 2017.
- *2015 Eastern Africa Universities Mathematics Programme (EAUMP) Summer School on Experimental Pure Mathematics* held at the Department of Mathematics, Makerere University, Kampala, Uganda from 6th to 24th July 2015.
- *17th Regional College on Modelling, Simulation and Optimization* held at the Department of Mathematics and Statistics, University of Cape Coast, Ghana from 4th to 8th May 2015.

- 2013/2014 National In-service Training for the Secondary Science and Mathematics Teachers' (SESEMAT) Programme on theme “*Content Reinforcement III - Material development towards a learner-centred lesson*”, held at Kibuli Senior Secondary School, Kampala from 5th to 9th May 2014.
- 2012/2013 National In-service Training for the Secondary Science and Mathematics Teachers' (SESEMAT) Programme on theme “*Content Reinforcement II - Effective usage of teaching materials*”, held at Kibuli Senior Secondary School, Kampala from 14th to 19th May 2013.

————— Seminars, Colloquia, and Invited Talks

- **Seminar Series:** *Diophantine Equations with Fibonacci and Pell Numbers*, held at Department of Mathematics, Makerere University, Kampala, Uganda on 15th August 2015.
- **Zahlentheoretisches Kolloquium:** *Fibonacci numbers which are products of two Pell numbers*, held at Institut für Analysis und Zahlentheorie, TU Graz, Graz, Austria on 28th April 2016.
- **Seminar Series:** *On a problem of Pillai with Fibonacci numbers and powers of 2*, held at Department of Mathematics, Makerere University, Kampala, Uganda on 11th January 2017.
- **Advanced Topics in Discrete Mathematics (DK):** *On a problem of Pillai with k -Fibonacci numbers and powers of 2*, held at Institut für Geometrie, TU Graz, Graz, Austria on 17th November 2017.
- **Seminar on Number Theory and Algebra:** *On a problem of Pillai with k -generalized Fibonacci numbers and powers of 2*, held at Department of Mathematics, University of Zagreb, Zagreb, Croatia on 6th December 2017. [Trip funded by OeAD-GmbH].
- **PLeaSANT (Participative Learning Seminar Analytic Number Theory):** *On a problem of Pillai with k -Fibonacci numbers and powers of 2*, held at Max Planck Institute for Mathematics, Bonn, Germany on 16th March 2018.
- **SFB-QMC Kooperationsworkshop 2018:** *On a problem of Pillai with k -Fibonacci numbers and powers of 2* (Poster presentation), held at JKU, Linz, Austria on 19th April 2018.
- **Doctoral Seminar Series SS-2018:** *On a problem of Pillai with k -Fibonacci numbers and powers of 2*, held at Institut für Geometrie, TU Graz, Graz, Austria on 25th May 2018.
- **Symposium Diskrete Mathematik 2018:** *On a problem of Pillai with k -generalized Fibonacci numbers and powers of 2* (Poster presentation), held at Institut für Diskrete Mathematik, TU Graz, Graz, Austria on 15th - 16th June 2018.
- **Conference on Diophantine m -tuples and Related Problems II:** *On the x -coordinates of Pell equations which are k -generalized Fibonacci numbers*, held at Purdue University Northwest, Westville/Hammond, Indiana, USA on 16th October 2018.
- **Algebra and Number Theory Seminar (AlgNTh):** *On the x -coordinates of Pell equations which are k -generalized Fibonacci numbers*, held at Institut für Mathematik und Wissenschaftliches Rechnen, Karl-Franzens-Universität Graz, Austria on 8th November 2018.
- **Doctoral Seminar Series WS-2018/19:** *On the x -coordinates of Pell equations which are k -Fibonacci numbers*, held at Institut für Mathematik und Wissenschaftliches Rechnen, Karl-Franzens-Universität Graz, Austria on 18th January 2019.
- **Salzburg Mathematics Colloquium:** *On the x -coordinates of Pell equations which are sums of two Padovan numbers*, held at the Department of Mathematics, Paris Lodron-University Salzburg, Austria on 19th August 2019.

Research Visits

- 03/18 **Visiting Florian Luca**, Max Planck Institute for Mathematics (MPIM), Bonn [DE].
- 05/19 **Visiting Yuri Bilu & Florian Luca**, Institut de Mathématiques de Bordeaux (IMB), Université de Bordeaux, Bordeaux [FR].
- 08/19 **Visiting Volker Ziegler**, Department of Mathematics, Paris Lodron-University Salzburg, Salzburg [AT].
- 09/19–11/19 **Extended Research Stay**, Max Planck Institute for Mathematics (MPIM), Bonn [DE]. [Fully funded by MPIM] .
- 01/22–03/22 **Research Stay**, Imperial College London (ICL), London, UK. [Funded by The Abram Gannibal Project: Collaborative research in applied algebra and geometry in Africa] .

Service to the Mathematics Community

- 2018 – date Reviewer for *Mathematical Reviews* (MathSciNet).
- 2018 – date Reviewer for *Zentralblatt Math* (zbMATH).
- 2020 – date Editorial Board Member, *International Journal of Discrete Mathematics*, SciencePG.
- 2018 – 2019 Referee for several travel grant proposals for the *Austrian Agency for International Cooperation in Education and Research (OeAD-GmbH)*.
- 2019 – date Referee for several items from *Mathematics MDPI* and *Symmetry MDPI*.
- 2018 – date Referee for several items from *Mathematica Slovaca*.
- 2018 – date Referee for two items from *Turkish Journal of Mathematics*.
- 2020 – date Referee for several items from *Boletín de la Sociedad Matemática Mexicana*.
- 2020 Referee for one item from *Revista Colombiana de Matemáticas*.
- 2020 Referee for one item from *Quaestiones Mathematicae*.
- 2020 Referee for one item from *Open Mathematics*.
- 2020 Referee for one item from *Arabian Journal of Mathematics*.
- 2021 Referee for one item from *Publicationes Mathematicae Debrecen*.
- 2022 Referee for one item from *International Journal of Number Theory*.
- 2022 Referee for one item from *Taiwanese Journal of Mathematics*.
- 2022 Referee for two items from *Integers: Electronic Journal of Combinatorial Number Theory*.
- 2022 Referee for one item from *Indian Journal of Mathematics*.

Memberships

- 2018 – Date **Member, American Mathematical Society (AMS)**.
- 2012 – Date **Member, Uganda Mathematical Society (UMS)**.
- 2017 – 2020 **Associate Member, Doctoral Program Discrete Mathematics - TU Graz**.
- 2016 – 2018 **Member, SFB “Quasi-Monte Carlo Methods: Theory and Applications”**.

Honours, Awards, Grants, Fellowships, and Scholarships

- Jun, 2020 **Graz University of Technology (TU Graz), Austria**, Awarded the doctoral degree *Doktor der Naturwissenschaften (Doctor rerum naturalium, Dr.rer.nat.)* [Doctor of Natural Sciences] *mit Auszeichnung bestanden* [Pass with Distinction] (GPA 1/1).
- 2016 – 2020 **The Austrian Science Fund (FWF)**, Awarded a fully funded fellowship to pursue the PhD in Mathematics at TU Graz through the projects: F05510-N26 –part of the SFB-QMC, P26114-N26 – Diophantine Problems, and W1230– Doctoral Program Discrete Mathematics.
- 2015 – 2016 **ICTP, Trieste, Italy**, Awarded a fully funded scholarship to pursue the Postgraduate Diploma in Mathematics at ICTP - Italy.

- Jun, 2015 **AIMS Ghana, Biriwa, Ghana**, Awarded the F. K. A. Allotey Meritorious Award for being an outstanding student and completing the degree of Master of Science in Mathematical Sciences with Distinction (Cum Laude, GPA 87/100).
- 2014 – 2015 **AIMS Ghana, Biriwa, Ghana**, Awarded a fully funded scholarship to pursue the degree of Master of Science in Mathematical Sciences at AIMS - Ghana.
- Jan, 2013 **Makerere University - Kampala, Uganda**, Awarded a First Class Honours degree of Bachelor of Science with Education (CGPA 4.48/5.00).
- 2009 – 2012 **Government of Uganda**, Awarded a fully funded scholarship based on academic merit to pursue the degree of Bachelor of Science with Education at Makerere University.

———— Languages

Luganda - Native, English - Fluent, German - Basic, Kiswahili - Basic.

———— Computer Skills

Intermediate C, Matlab, \LaTeX , Sage, Python, PARI/GP, Mathematica.

Miscellaneous Windows, Office, Linux, Debian, Ubuntu Desktop.

———— Co-curricular Activities

Playing Football, Playing Volleyball, Watching Football on TV and Reading Novels.

———— References

1. **Prof. Dr. Robert Tichy**, Professor of Mathematics, Institute of Analysis and Number Theory, TU Graz, Steyrergasse 30/II, A-8010, Graz, Austria.
Email address: tichy@tugraz.at
2. **Prof. Dr. Florian Luca**, Professor of Mathematics, School of Mathematics, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa.
Email address: Florian.Luca@wits.ac.za
3. **Prof. David Ssevviiri**, Associate Professor, Department of Mathematics, Makerere University, P.O.Box 7062 Kampala, Uganda.
Email address: david.ssevviiri@mak.ac.ug

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