Curriculum Vitae

Mahadi Ddamulira, Ph.D.

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Employment History

2021 – Date	🔖	**Lecturer**, Department of Mathematics, Makerere University, Kampala, Uganda.
2020 – 2021	🔖	**Postdoctoral Researcher**, MPI for Software Systems, Saarbrücken, Germany.
2016 – 2020	🔖	**University Project Assistant (Praedoc and Postdoc)**, Institute for Analysis and Number Theory, Graz University of Technology (TU Graz), Graz, Austria.
2013 – 2014	🔖	**Mathematics and Physics Teacher**, Mariam High School, Kampala, Uganda.
2012 – 2014	🔖	**Mathematics and Physics Teacher**, Bweyogerere Secondary School, Kampala.

Education Background

2016 – 2020	🔖	**Ph.D. (Dr.rer.nat.) in Mathematics**, Graz University of Technology, Austria. Thesis title: *Diophantine Equations and Linearly Recurrent Sequences*.
2015 – 2016	🔖	**Postgraduate Diploma in Mathematics**, ICTP, Trieste, Italy. Thesis title: *The Algorithmic Solution of Diophantine Equations*.
2014 – 2015	🔖	**M.Sc. in Mathematical Sciences**, AIMS Ghana, Biriwa, Ghana. Thesis title: *Diophantine Equations with Fibonacci and Pell Numbers*.
2009 – 2012	🔖	**B.Sc. with Education**, Makerere University, Kampala, Uganda.

Teaching Experience (at Makerere University)

B.Sc. courses	🔖	MTH1101 Calculus I, MTH1103 Foundations of Mathematics, MTH2101 Real Analysis I, MTH2201 Abstract Algebra, MTH3112 Mathematical Logic, MTH3210 Graph Theory, and MTH3214 Number Theory.
M.Sc. courses	🔖	MTH7104 Integration Theory, MTA7114 Fundamentals of Probability and Statistics, MTH7213 Algebraic Number Theory, and MTH7218 Analytic Number Theory.

Teaching and Research Interests

2016 – Date	🔖	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.

Research Publications

Peer Reviewed Journal Articles

1. H. Batte, **M. Ddamulira**, J. Kasozi, and F. Luca. Multiplicative independence in the sequence of k–generalized Lucas numbers. *Indag. Math.*, 2024. DOI: 10.1016/j.indag.2024.09.002.

2. H. Batte, **M. Ddamulira**, J. Kasozi, and F. Luca. On the exponential Diophantine equation $U_n^x + U_{n+1}^x = U_m$. *Ramanujan J.*, 64(1):153–184, 2024. DOI: 10.1007/s11139-023-00818-x.

3. **M. Ddamulira**, P. Emong, and G. I. Mirumbe. Palindromic concatenations of two distinct repdigits in Narayana's cows sequence. *Bull. Iranian Math. Soc.*, 50(3):35, 2024. DOI: 10.1007/s41980-024-00877-w.

4. **M. Ddamulira** and F. Luca. On the x–coordinates of Pell equations that are products of two Pell numbers. *Math. Slovaca*, 74(1):41–56, 2024. DOI: 10.1515/ms-2024-0004.

5. H. Batte, T. P. Chalebgwa, and **M. Ddamulira**. Perrin numbers that are concatenations of two repdigits. *Arab. J. Math.*, 11(3):469–478, 2022. DOI: 10.1007/s40065-022-00388-8.

6. 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. *Glasnik Mat.*, 57(2):185–201, 2022. DOI: 10.3336/gm.57.2.02.

7. **M. Ddamulira**, F. Luca, and R. Tichy. On the Shorey–Tijdeman Diophantine equation involving terms of Lucas sequences. *Indag. Math.*, 33(2):314–321, 2022. DOI: 10.1016/j.indag.2021.08.001.

8. 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(3):108, 2021. DOI: 10.1007/s13398-021-01047-x.

9. **M. Ddamulira**. On the x–coordinates of pell equations that are sums of two Padovan numbers. *Bol.Soc. Mat. Mex.*, 27:1–23, 2021. DOI: 10.1007/s40590-021-00312-8.

10. **M. Ddamulira**. Padovan numbers that are concatenations of two distinct repdigits. *Math. Slovaca*, 71(2):275–284, 2021. DOI: 10.1515/ms-2017-0467.

11. **M. Ddamulira** and F. Luca. On the exponential Diophantine equation related to powers of two consecutive terms of Lucas sequences. *Ramanujan J.*, 56(2):651–684, 2021. DOI: 10.1007/s11139-020-00278-7.

12. **M. Ddamulira**. On a problem of Pillai with Fibonacci numbers and powers of 3. *Bol. Soc. Mat. Mex.*, 26(2):263–277, 2020. DOI: 10.1007/s40590-019-00263-1.

13. **M. Ddamulira**. On the x–coordinates of Pell equations that are products of two Padovan numbers. *Integers*, 20:Paper No. A70, 20, 2020.

14. **M. Ddamulira**. On the x–coordinates of Pell equations that are products of two Lucas numbers. *Fibonacci Quart.*, 58(1):18–37, 2020. DOI: 10.1080/00150517.2020.12427602.

15. **M. Ddamulira**. Repdigits as sums of three balancing numbers. *Math. Slovaca*, 70(3):557–566, 2020. DOI: 10.1515/ms-2017-0371.

16. **M. Ddamulira**. Repdigits as sums of three Padovan numbers. *Bol. Soc. Mat. Mex.*, 26(2):247–261, 2020. DOI: 10.1007/s40590-019-00269-9.

17. **M. Ddamulira**. Tribonacci numbers that are concatenations of two repdigits. *Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM*, 114(4):203, 2020. DOI: 10.1007/s13398-020-00933-0.

18. **M. Ddamulira** and F. Luca. On the x–coordinates of Pell equations which are k–generalized Fibonacci numbers. *J. Number Theory*, 207:156–195, 2020. DOI: 10.1016/j.jnt.2019.07.006.

19   **M. Ddamulira** and F. Luca. On the problem of Pillai with k–generalized Fibonacci numbers and powers of 3. *Int. J. Number Theory*, 16(07):1643–1666, 2020. 🔗 DOI: 10.1142/S1793042120500876.

20   **M. Ddamulira** and F. Luca. The x–coordinates of Pell equations and sums of two Fibonacci numbers II. *Proc. Indian Acad. Sci. Math. Sci*, 130:1–21, 2020. 🔗 DOI: 10.1007/s12044-020-00578-4.

21   **M. Ddamulira**. On the problem of Pillai with Padovan numbers and powers of 3. *Stud. Sci. Math. Hung.*, 56(3):364–379, 2019. 🔗 DOI: 10.1556/012.2019.56.3.1435.

22   **M. Ddamulira**. On the problem of Pillai with tribonacci numbers and powers of 3. *J. Integer Sequences*, 22(2):3, 2019.

23   **M. Ddamulira**, C. A. Gómez, and F. Luca. On a problem of Pillai with k–generalized Fibonacci numbers and powers of 2. *Monat. Math.*, 187(4):635–664, 2018. 🔗 DOI: 10.1007/s00605-018-1155-1.

24   **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(3):411–421, 2017. 🔗 DOI: 10.1007/s12044-017-0338-3.

25   **M. Ddamulira**, F. Luca, and M. Rakotomalala. Fibonacci numbers which are products of two Pell numbers. *Fibonacci Quart.*, 54(1):11–18, 2016. 🔗 DOI: 10.1080/00150517.2016.12427833.

Theses and Dissertations

1   **M. Ddamulira**. *Diophantine Equations and Linearly Recurrent Sequences*. PhD thesis, Technische Universität Graz (Austria), 2020. ISBN: 979-8662-39876-4.

2   **M. Ddamulira**. *The Algorithmic Solution of Diophantine Equations*. Master's thesis, International Centre for Theoretical Physics (ICTP), 2016. ISBN: 978-3-330-00696-6.

3   **M. Ddamulira**. *Diophantine Equations with Fibonacci and Pell Numbers*. Master's thesis, African Institute for Mathematical Sciences (AIMS) Ghana, 2015.

Research Grants

2023 – 2025   🔖   Africa – Uninet Project: **P105-Uganda** | *Effective Resolution of Exponential Diophantine Equations* | Paris Lodron University Salzburg, Makerere University, Graz University of Technology, **EUR 11.600,00**. Co-PI at Makerere University.

Research Visits

October 2024   🔖   **Research Visit**, Department of Mathematics, Paris Lodron-University Salzburg, Austria. [Funded by Africa-Uninet Project: **P105-Uganda**].

Jan. – Mar. 2022   🔖   **Research Stay**, Imperial College London (ICL), London, UK. [Funded by **The Abram Gannibal Project**: Collaborative research in applied algebra and geometry in Africa].

Sep. – Nov. 2019   🔖   **Extended Research Stay**, Max Planck Institute for Mathematics (MPIM), Bonn Germany. [Fully funded by MPIM].

August 2019   🔖   **Research Visit**, Department of Mathematics, Paris Lodron-University Salzburg, Salzburg, Austria.

May 2019   🔖   **Research Visit**, Institut de Mathématiques de Bordeaux (IMB), Université de Bordeaux, Bordeaux, France.

March 2018   🔖   **Research Visit**, Max Planck Institute for Mathematics, Bonn Germany.

Service to the Mathematics Community

2018 – Date 🔖 Reviewer for *Mathematical Reviews* (MathSciNet).

2018 – Date 🔖 Reviewer for *Zentralblatt Math* (zbMATH).

2019 – Date 🔖 Referee for several papers in: Mathematica Slovaca, Turkish Journal of Mathematics, Boletín de la Sociedad Matemática Mexicana, Revista Colombina de Matemaáticas, Quaestiones Mathematicae, Open Mathematics, Arabian Journal of Mathematics, Publicationes Mathematicae Debrecen, International Journal of Number Theory, Taiwanese Journal of Mathematics, Integers, Indian Journal of Mathematics, Bulletin of the Iranian Mathematical Society, Journal of Integer Sequences, Monatshefte für Mathematik, Indian Journal of Pure and Applied Mathematics, Periodica Mathematica Hungarica, Rad HAZU, and RACSAM.

Supervision of Graduate Students

Completed

2021 – 2022 🔖 Herbert Batte (2019/HD13/993U) – M.Sc. (Mathematics), Makerere University. Thesis Title: **Solutions to a non-linear Diophantine equation of Pillai type**, May 2022.

2022 – 2025 🔖 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**, Defended Thesis, March 2025.

On-going

2022 – Date 🔖 Valentine Okiru (2021/HD13/2577U) – M.Sc. (Mathematics), Makerere University. Thesis Title: **Multiplicative independence in k–generalized Fibonacci and Pell sequences**, Research Proposal approved by Graduate School.

2023 – Date 🔖 Shube Nakawunde (2021/HD13/2575U) – M.Sc. (Mathematics), Makerere University. Thesis Title: **On lattice points which become an infinite set on Heronian triangles**, Research Proposal approved by Graduate School.

2023 – Date 🔖 Samson Mugaya (2022/HD13/23342U) – Ph.D. (Mathematics), Makerere University. Thesis Title: **Solutions to Diophantine equations involving Fibonacci-like sequences and factorials**, Research Proposal presented at the Department.

Languages and Computer Skills

Languages 🔖 Luganda – Native, English – Fluent, German – Basic, Kiswahili – Basic.

Coding 🔖 C, Python, R, Mathematica, SageMath, Matlab, LaTeX.

Miscellaneous 🔖 Windows, Office, Linux, Debian, AIMS/Ubuntu Desktop.

References

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Dr. Ismail Mirumbe
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