Maxie Dion Schmidt
MathJobs Publication List and Software Projects

B Bibliography and software contributions

▸ B.1 – Peer-reviewed publications

[1] Merca, M. and Schmidt, M. D. *A partition identity related to Stanley's theorem*. Amer. Math. Monthly 125 **10**: 929–933 (2018). https://doi.org/10.1080/00029890.2018.1521232

[2] Merca, M. and Schmidt, M. D. *Factorization theorems for generalized Lambert series and applications*. Ramanujan J. **51**: 391–419 (2020). https://doi.org/10.1007/s11139-018-0095-7

[3] Merca, M. and Schmidt, M. D. *Generating special arithmetic functions by Lambert series factorizations*. Contrib. Discrete Math. 14 **(1)**: 31–45 (2019).

[4] Merca, M. and Schmidt, M. D. *The partition function $p(n)$ in terms of the classical Möbius function*. Ramanujan J. **49**: 87–96 (2019).

[5] Mousavi, H. and Schmidt, M. D. *Factorization theorems for relatively prime divisor sums, GCD sums and generalized Ramanujan sums*. Ramanujan J. **54**: 309–341 (2021). http://doi.org/10.1007/s11139-020-00323-5

[6] Schmidt, M. D. *A computer algebra package for polynomial sequence recognition*. Illinois IDEALS (2014). https://www.ideals.illinois.edu/handle/2142/49378

[7] Schmidt, M. D. *A short note on integral transformations and conversion formulas for sequence generating functions*. Axioms Special Issue on Mathematical Analysis and Applications II 8 **2**, 62 (2019). https://doi.org/10.3390/axioms8020062

[8] Schmidt, M. D. *Combinatorial identities for generalized Stirling numbers expanding f-factorial functions and the f-harmonic numbers*. J. Integer Seq. 21 **18.2.7** (2018).

[9] Schmidt, M. D. *Combinatorial sums and identities involving generalized divisor functions with bounded divisors*. Integers 20 **A85** (2020).

[10] Schmidt, M. D. *Continued fractions and q-series generating functions for the generalized sum-of-divisors functions*. J. Number Theory 180: 579–605 (2017). https://doi.org/10.1016/j.jnt.2017.05.023

[11] Schmidt, M. D. *Continued Fractions for Square Series Generating Functions*. Ramanujan J. **46**: 795–820 (2018). https://doi.org/10.1007/s11139-017-9971-9

[12] Schmidt, M. D. *Generating function transformations related to polylogarithm functions and the k-order harmonic numbers*. Online J. Anal. Comb. 12 **2** (2017).

[13] Schmidt, M. D. *Exact formulas for the generalized sum-of-divisors functions*. Integers 21 **A19** (2021).

[14] Schmidt, M. D. *Generalized j-factorial functions, polynomials, and applications*. J. Integer Seq. 13 **10.6.7** (2010).

[15] Schmidt, M. D. *Jacobi-type continued fractions and congruences for binomial coefficients modulo integers $h \geq 2$*. Integers 18 **A46** (2018).

[16] Schmidt, M. D. *Jacobi-type continued fractions for the ordinary generating functions of generalized factorial functions*. J. Integer Seq. 20 **17.3.4** (2017).

[17] Schmidt, M. D. *New congruences and finite difference equations for generalized factorial functions*. Integers 18 **A78** (2018).

[18] Schmidt, M. D. *New recurrence relations and matrix equations for arithmetic functions generated by Lambert series*. Acta Arith. 181 (2017): 355-367. http://doi.org/10.4064/aa170217-4-8

[19] Schmidt, M. D., Kirkpatrick, A., and Heitch, C. *RNAStructViz: graphical base pairing analysis*. Bioinformatics **197** (2021). https://doi.org/10.1101/2021.01.20.427505

[20] Schmidt, M. D. *Square series generating function transformations*. J. Inequal. Spec. Funct. 8 **2** (2017).

[21] Schmidt, M. D. *Zeta series generating function transformations related to generalized Stirling numbers and partial sums of the Hurwitz zeta function*. Online J. Anal. Comb. 13 **158**. (2018).

▸ B.2 – Preprint manuscripts

[22] Schmidt, M. D. *A catalog of interesting and useful Lambert series identities*. Preprint (2020). https://arxiv.org/abs/2004.02976

[23] Schmidt, M. D. *A computer algebra package for polynomial sequence recognition*. Preprint (2016). https://arxiv.org/abs/1609.07301

- Schmidt, M. D. *A recent open source embedded implementation of the DESFire specification designed for on-the-fly logging with NFC based systems*. Preprint (2021).

[24] Schmidt, M. D. *Factorization theorems for Hadamard products and higher-order derivatives of Lambert series generating functions*. Preprint (2017). https://arxiv.org/abs/1712.00608

[25] Schmidt, M. D. *New characterizations of partial sums of the Möbius function*. Preprint (2021). https://arxiv.org/abs/2102.05842

[26] Merca, M. and Schmidt, M. D. *New factor pairs for factorizations of Lambert series generating functions*. Preprint (2017). https://arxiv.org/abs/1706.02359

[27] Schmidt, M. D. *Pair correlation and gap distributions for substitution tilings and generalized Ulam sets in the plane*. Preprint (2017). https://arxiv.org/abs/1707.05509

▸ B.3 – STEM supportive and educational software

GTFold Python: Python bindings and library to modernize and extend for the historical set of *GTFold* command line utilities for use with Python. It is a scientific computing project to facilitate experimentation with RNA structures in computational biology. The source code will be released publicly on GitHub in late 2021.

Mathematically-oriented Unix fortune utility mod: A math-related add-on package providing terminal-based text to be displayed on the command line in the form of Unix fortune cookie wisdom. It features a custom *Concrete Math* book style upper case Σ summation ASCII-art graphic.

`github/maxieds/math-fortune-mod`

Mertens function manuscript computational supplement: Facilitates computations with and exploration of the Mertens function, $M(x)$, in both *SageMath* and *Mathematica*. Software and supporting documentation written to accompany the publication of [25].

`github/maxieds/MertensFunctionComputations`

OptiKey "Big Hacker" keyboard extensions: Open source code and documentation that makes typing programming languages on-screen for users with disabilities more accessible. These extensible "Big Hacker" encoded keyboards are designed to simplify on-screen entry of programming languages. This task otherwise requires scrolling through a cell-phone-style nested set of keyboard screens to enter a single line of code in C++, Perl or Python.

Partitions into parts package: An extendable and expository Mathematica demo package for computing the number of partitions of a positive integer n into parts of the form $pt + a$ for p prime and $0 \leq a < p$.

`github/maxieds/PartitionsIntoParts`

Prairie Learn contributor: Prairie Learn is an open source *learning management system* (or LMS) that is a viable option to replace usage of the popular *Canvas* LMS at many universities. It is actively developed at UBC and UIUC and is used on a private server form at UC Berkeley. I have so far contributed code to enable custom function names, symbolic constants, custom-defined operator symbols, and documentation available for use with `sympy` Python library parsing of internal `pl-symbolic-input` elements. This pull request enables crucial parsing for questions in calculus, mathematics and physics by enabling custom function names and symbolic constants.

`github/PrairieLearn/PrairieLearn`

RNAStructViz: A cross-platform GUI-based application to visualize and compare RNA secondary structures that commonly arise in mathematical biology applications. See the application note in [19].

`github/gtDMMB/RNAStructViz/wiki`

Sage and Mathematica special sequence formula recognition packages: UIUC MS thesis software in both Mathematica (original) and Sage (extended). Designed to recognize formulas for sequences involving special combinatorial primitives and functions.

`github/maxieds/GuessPolynomialSequences`

`github/maxieds/sage-guess`

WXML tilings Python library: I was offered an unforgettable opportunity by Jayadev Athreya over 2016–2017 to take part in mentoring advanced undergraduates in mathematics. The course outline focused on getting students hands-on experience with experimental mathematics methodology, gap distributions and spatial statistics and visualizing substitution tilings of the plane in the Python programming language.

`github/maxieds/WXMLTilingsHOWTO`

▸ B.4 – Other significant open source software

Android file picker light library: A file and directory chooser widget library for Android OS that focuses on presenting an easy to configure lightweight UI. Designed from the top down to work with newer Android 10 and 11 (API 29+) platforms in the future.

`github/maxieds/AndroidFilePickerLight`

Chameleon Mini crypto mod firmware extension: A modification of the stock Chameleon Mini firmware sources to enable cryptographically secure and integrity checked binary data uploads onto the device.

`github/maxieds/ChameleonCryptoModFirmware`

Chameleon Mini Live Debugger (CMLD): An interactive NFC logging interface for Android OS phones that interfaces to Chameleon Mini hardware over USB. Over 500 active users on the Google *Play Store*.

`github/maxieds/ChameleonMiniLiveDebugger`

DESFire emulation support for the Chameleon Mini: The Chameleon Mini is a hardware tool for NFC debugging, card emulation, security testing, reconnaissance, and general purpose low-level data logging for contactless RFID cards like university IDs. This work enables embedded emulation support for the complex and proprietary Mifare DESFire type NFC tags on recent Chameleon Mini devices.

`github/emsec/ChameleonMini`

`github/maxieds/ChameleonMiniDESFireStack`

Homebrew live streamer: A customizable, roll-your-own solution for live A/V recording to an Android phone device. It is also used with live media streaming to Facebook and YouTube for a transparent, open source non-proprietary application to perform the media streaming. The application was written to covertly record a private memento of a special three hour Smashing Pumpkins concert in Atlanta from 2018.

`github/maxieds/HomeBrewLiveStreamer`

Mifare classic tool library: A Java and Android OS library wrapper around the functionality of the popular *Mifare Classic Tool* (MCT) application for Android phones.

github/maxieds/MifareClassicToolLibrary
github/maxieds/ChameleonMiniUSBInterface