

# Sai Sivakumar

Email: [sivakumars@ufl.edu](mailto:sivakumars@ufl.edu)

University of Florida

## ■ Goals

Seeking to obtain a B.Sc. in mathematics.

## ■ Education

*July 2020 - present:* B.Sc. in Mathematics with a 3.98 GPA currently, University of Florida, Gainesville, Florida. To graduate May 2024.

*August 2016 - June 2020:* Graduated with IB diploma with a 4.0 GPA, Stanton College Preparatory High School, Jacksonville, Florida.

## ■ Talks and Presentations

*February - March 2022:* To be expected. Will give a series of lectures/talks which briefly outline Fourier analysis on finitely generated abelian groups with some neat results, as they appear in Stein and Shakarchi I.

*October 2021:* A classmate and I discussed the real Hamilton quaternions, their history as well as their algebraic properties, and mentioned analytic problems with functions of quaternionic variables. Also spoke about applications in computer science and physics.

*October 2021:* Gave the annual L<sup>A</sup>T<sub>E</sub>X joint seminar with the UF Graduate Mathematics Association. This seminar is designed to demonstrate how L<sup>A</sup>T<sub>E</sub>X works and what it can do, and to encourage mathematics students to learn L<sup>A</sup>T<sub>E</sub>X.

*June 2021:* Discussed the integral definition of the inverse Laplace transform, as well as how to compute the integral using the residue theorem, at an elementary level. ([YouTube](#))

*March 2021:* Gave a talk on proving the fundamental theorem of calculus at a highschool/pre-real analysis level. ([YouTube](#))

## ■ Skills

3+ years of L<sup>A</sup>T<sub>E</sub>X experience (high proficiency).

Proficiency in Java, C++, and understanding of data structures and algorithms.

## ■ Outreach/Service

*September 2021 - present:* Member of the Algebra seminar group.

*August 2021 - present:* Teaching assistant for MAP2302 Elementary Differential Equations.

*August 2021 - present:* Member of the Association for Women in Mathematics' UF chapter.

*August 2021 - present:* Academic Director of the University Math Society at UF. I schedule all

talks from professors and give talks myself, as well as encouraging other students to give talks as well.

*March 2021 - present:* Moderator for a large online community (exceeding 75,000 members globally) which seeks to stimulate mathematical discussion and interest, as well as to provide assistance with math problems/concepts.

*August 2020 - December 2020:* Typed up many solutions for *Concepts in Calculus III* by Miklos Bona and Sergei Shabanov (around 47 pages or so, working with two others to form in total 141 pages of solutions compiled in a solution manual).

*August 2019 - February 2020:* Started a small unofficial mathematics club (in highschool) where students presented on topics of mathematical interest; there I gave three informal talks.

### ■■■■ Honors/Awards

Dean's list, *Fall 2020, Spring 2021, Summer 2021.*

National Merit Scholarship Commended 2020.

National AP Scholar 2020.

### ■■■■ Relevant Coursework

*From most recent to earliest, and items marked by a <sup>†</sup> are graduate or mixed graduate/undergraduate level courses:*

*MTG4303<sup>†</sup>:* Introductory Topology II – (Self-studied material found in the first semester before enrollment in this course.) Second semester of introductory topology, covering basic algebraic topology and more topics in point-set topology. Chapters 5-6, 9-12 from Munkres. Spring 2022

*MAA4212:* Advanced Calculus II – Second semester of introductory real analysis, covering analysis in metric spaces and theory of functions of several real variables. Professor's notes. Spring 2022

*MAP4341<sup>†</sup>:* Introduction to Partial Differential Equations – Elementary theory of solving partial differential equations. Professor's notes and lectures. Spring 2022

*MAT4930<sup>†</sup>:* Introduction to Algebra II – Second semester graduate level algebra; covering rings, fields, modules. Chapters 7-13 of Dummit and Foote. Spring 2022

*MAA4211:* Advanced Calculus I – First semester of introductory real analysis. Chapters 1-7 of Abbott. Fall 2021

*MAS4413:* Fourier Analysis – Elementary theory of Fourier analysis. Chapters 1-7 of Stein and Shakarchi I. Fall 2021

*MAT4930<sup>†</sup>:* Introduction to Algebra I – First semester graduate level algebra; covering group theory. Chapters 1-6 from Dummit and Foote. Fall 2021

*MAP4305:* Ordinary Differential Equations – Second course in ordinary differential equations.

Covered methods of using matrices for systems of linear ODEs, the method of Frobenius for second order ODEs, solving regular Sturm-Liouville boundary value problems, and using Green's functions. Professor's lectures. Summer 2021

*MAA4402*: Introductory Complex Analysis – Elementary theory of functions of a complex variable. Chapters 1-7 of Brown and Churchill. Spring 2021

*MAS4105*: Introductory Linear Algebra – Proof-based linear algebra. Chapters 1-6 of Friedberg, Insel, Spence. Spring 2021

*MAS4203*: Introductory Number Theory – Elementary concepts in number theory. Chapters 1-3 of Niven and Zuckerman. Spring 2021

*MAS4301*: Introductory Abstract Algebra – Elementary group theory. Chapters 1-11 of Gallian. Spring 2021

*MAC3474*: Honors Calculus III – Basic multivariable calculus. Chapters 1-5 of *Concepts in Calculus III* by Miklos Bona and Sergei Shabanov. Fall 2020

*MAP2302*: Honors Elementary Differential Equations – Covered how to solve various basic ODEs, basic notions of existence and uniqueness, and applications to physics. Chapters 1-8 in Nagle Saff Snider 7th edition. Fall 2020

*MHF3202*: Sets and Logic – Taught elementary set theory and how to write basic proofs. Chapters 1,2,3, 5-10, 12, 14 in Book of Proof by Richard Hammack. Fall 2020