Mathematical Me

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Foresee
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The following equations that I have written down here encapsulate my entire life rather completely and thoroughly in ways that I think are pretty good and also meaningful:

$$K_{n+1} = K_n + \alpha P_n + \beta C_n + \gamma R_n \tag{1}$$

$$S(T, E) = S_{\max}\left(1 - e^{-\lambda T}\right) + \mu E \tag{2}$$

$$\text{Premium} = BS(S, K, r, \sigma, t) + \eta \cdot \mathcal{N}(0, 1), \qquad \eta \to \infty \tag{3}$$

$$I = \kappa \cdot \text{Skill} \cdot \text{Intent} - \delta \cdot \text{Risk}^2 \tag{4}$$

$$\begin{aligned} F = &\int \frac{\partial\, \text{Immersion}}{\partial\, \text{Pages}}\, \mathrm{d}(\text{Pages}) + \int \frac{\partial\, \text{Immersion}}{\partial\, \text{Prose}}\, \mathrm{d}(\text{Prose}) \\ &+ \int \frac{\partial\, \text{Immersion}}{\partial\, \text{World}}\, \mathrm{d}(\text{World}) + \int \frac{\partial\, \text{Immersion}}{\partial\, \text{Characters}}\, \mathrm{d}(\text{Characters}) \end{aligned} \tag{5}$$

In equation 1, which is the first equation that I wrote down and thought about for a while, I am looking at my cumulative knowledge growth over time, which is something that models how practical coding and challenges and also research accumulate over time in my life, and mathematically speaking, each component that I included contributes linearly to the overall result, so balancing them according to their weights which are the Greek letters maximizes overall growth in a way that reflects my approach to learning efficiently and also effectively. In equation 2, which comes after the first equation and is the second one, I am examining my skill as a function of time and efficiency, and the partial derivatives $\frac{\partial S}{\partial T}$ and $\frac{\partial S}{\partial E}$ and also the limit $\lim_{T\to\infty} \frac{\partial S}{\partial T} = 0$ show that efficiency drives growth more than time does, which guides me to focus on deliberate effort rather than just spending long hours working on things without being efficient about it. In equation 3, I am analyzing quantitative analysis premiums through a Black–Scholes model that has an added stochastic noise term that makes it more complex, and the limit $\lim_{\eta\to\infty} \text{Premium}$ demonstrates that

randomness dominates the equation, which illustrates how real outcomes feel unpredictable despite the fact that I understand the formulas and the math behind them. In equation 4, I am quantifying my real-world impact by combining skill and intent and risk together in one equation, and the quadratic risk term shows nonlinear penalties that happen when risk gets too high, so I must carefully calibrate my actions to maximize meaningful contributions in projects like my research paper that I'm working on and also my work with the IT Army of Ukraine which is important to me. Finally, in equation 5, which is the last equation but not necessarily the least important one, I am modeling fun as immersion that is derived from reading progression fantasy books that I enjoy, and evaluating partial derivatives with respect to Pages and Prose and World and Characters reveals which books provide the strongest engagement per axis of measurement, with *Cradle* excelling in Pages and Characters while *The Stormlight Archive* excels in World-building and the *Azura Ghost* series excels in Prose quality, which allows me to quantify and prioritize my enjoyment in a mathematical way that makes sense to me.

In the past, which was before now obviously, a great positive influence on my journey into mathematics was Mrs. Kottwitz who everyone called Godwitz, and she taught me the intricate beauties of single-variable calculus in ways that were really good and helpful, and along the same lines but in a different way, my incredibly ill-tempered geometry teacher whose name was Mr. Lantiere taught me to hate geometric proofs by giving the class impossibly long exams that were way too hard and had too many problems, which led to a class average of 62 by the end of the year which was pretty bad, but this negative experience was counteracted by the success I was seeing in looking ahead into Pre-Calculus, which was a venture on which I found the amazing resources of the Internet that were available for free. Chief among these Internet resources stands the wonderful YouTube channel 3Blue1Brown, which is run by Grant Sanderson who makes really good videos about math topics, and much earlier in my study of mathematics, which was when I was around the age of 2 or 3 years old, I was unable to count at precisely the number 3 for some reason that I don't really understand, and I could go from 1 to 2 or count backwards like $7, 6, 5, 4, \ldots$ but I never could say the number 3 which was weird, although I'm not exactly sure when I got past that roadblock in my counting abilities though it must have happened at some point. Overall, and especially recently in my mathematical journey, my comprehensive body of experience that includes all the things I mentioned and probably some

other things too has left positive impressions deep in my mind regarding math and mathematical concepts, which is why I'm attempting this class that we're in right now and why I think it will be good for me.

Presently, which means right now in the current time period, I expect to be given an appropriate introduction to true higher level math by my Professor who seems like a good teacher, and so far, I can say that meeting him has led me to raise my hopes for the year and what we'll accomplish, and I hope to be challenged and confused and be wrong sometimes in ways that I never expected before, which will help me learn better. As an academic scholar, which is what I am or at least what I'm trying to be, I should be expected to submit work of my highest effort and quality, and additionally, I should be expected to spend sufficient time on coursework that the educator prepared for my benefit and learning, and I simply expect the course to cover the content laid out in the course syllabus that was given to us at the beginning, but if it manages to make connections to build a deeper understanding of the material, then I would consider it to exceed my expectations in a good way that would make me happy.

I'm interested in quantitative finance, which is a field that applies mathematical models and computational techniques to analyze markets and guide investment strategies for making money, and I'm drawn to the complex mathematics in quantitative finance, such as stochastic calculus and models like Heston's model, which capture volatility dynamics and randomness in asset prices that go up and down in unpredictable ways. Quantitative finance is grounded in advanced mathematical concepts such as stochastic differential equations and Itô calculus and measure-theoretic probability and martingale theory and partial differential equations for modeling asset dynamics and risk management, but I currently have a very flimsy, almost non-existent, grasp on most of this material due to the fact that my mathematical ability is still in its infancy and I haven't learned enough yet. I intend to take and pursue a degree in Physics (BS in Physics, UT Austin) at UT, which will help me to better grasp high-level math and surface modeling and other advanced topics that are important, and together, UT Austin's M 427J and 427K and 427L provide the mathematical foundation for quantitative finance by teaching me linear algebra and eigenvalue methods for modeling systems in 427J, and differential equations and Fourier analysis for handling dynamic processes in 427K, and multivariable calculus and vector analysis for understanding gradients and integrals and theorems essential to stochastic modeling in 427L (Mathematics Course Catalog, UT Austin), and I'm hoping to attend The University of

Texas at Austin due to its acceptable balance of cost and prestige and distance from where I live and a few other factors that are important to me and my family.

In conclusion, mathematics has shaped both my academic journey and my future ambitions in ways that are significant and meaningful to me, and the equations I created reflect how I see learning and growth and even enjoyment through a quantitative lens that makes sense mathematically, and my teachers and early experiences provided both challenges and inspiration that strengthened my interest in math over time, and looking ahead to the future, I hope to deepen my understanding through rigorous coursework and research at UT Austin where I plan to study, and ultimately, I aim to connect advanced mathematics with real-world applications such as quantitative finance and other areas that interest me and could be good career paths.

Works Cited

BS in Physics, UT Austin. 2025. catalog.utexas.edu/undergraduate/natural-sciences/degrees-and-programs/bs-physics/#text.

Mathematics Course Catalog, UT Austin. 2025. catalog.utexas.edu/general-information/coursesatoz/m/.