

Mathematics

Contract	Term	Course	Contract Title	Contract Description
319021	Spring 2016	MATH-3556	The use of Partial Differential Equations in Engineering	Partial differential equations are used in many facets of engineering. Because of this, I would like to further explore their use in the engineering field, especially their use in the control theory. I would like to gain a better understanding of the concepts behind control theory and how partial differential equations describe their various systems. As the class progresses and I gain a better understanding of the concepts behind partial differential equations, I want to also include in my research problems that control theory generates as examples and answers solved using my knowledge of the subject.
319023	Spring 2016	MATH-3155	Construction of the Real Numbers by the Method of Dedekind Cuts	It is well known that the set of Rational Numbers with their usual linear or total ordering has gaps. These gaps make the linear ordering in Rational Number System incomplete in the sense that not every set of rational numbers which is bounded above has a least upper bound or supremum. This incompleteness is related to the fact that, for instance, the equation $(x)(x)=2$ has no solution in the Rationals. Fixing these problems leads in a natural way to the construction of the set of the Real Numbers. There are least two ways in which this could be done. In one of them real numbers are equivalence classes of Cauchy sequences of rational numbers. The other method, the one I have in mind, uses the notion of Dedekind cuts. In this work I will define the notion of cuts in the set of rational numbers and show how they can be used to construct a larger set, in this specific instance the real numbers, with the desired properties.
318013	Spring 2016	MATH-5185U	Barlow-Popoviciu Formula and other Math Discoveries: Who Deserves the Credit?	Credit for results in the sciences has led sometime in more or less famous controversies. The most known one is the calculus controversy between Newton and Leibniz. The goal of my project is to research how and why such problems in the history of mathematics happen. What are the causes of these cases? For my project, I will first research the process in which a mathematician receives acknowledgement for his work. Then, I will research specifically the Barlow-Popoviciu formula. In order to find the reasoning behind these accreditations, I will look into the history of both of these mathematicians, the time period in which each lived, and whom exactly in the mathematics world decided to give both credit. Finishing my project, I will present my findings in a paper, of which I will submit to a mathematics journal.