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Department

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12:30pm
(Refreshments at 12:15pm)
UC 307

**AN INDEPENDENT
AXIOM SYSTEM
FOR THE REAL
NUMBERS**

ABSTRACT: Since the birth of formal mathematical logic, mathematicians have considered it aesthetically pleasing to axiomatize theories (which are axiomatizable) irredundantly, that is, in such a way that no axiom may be proved from the remaining axioms. In this case, such an axiom system is said to be independent. A famous early example of an independent axiom system is Hilbert's (original) axioms for Euclidean geometry. Since then, independent axiom systems have been found for various mathematical structures, including fields and vector spaces. To illustrate, it is a fairly well-known exercise in basic algebra to prove that the commutative axiom for addition is redundant in the set of axioms for a ring with identity. In this talk, we present an independent axiomatization of the complete ordered field of real numbers. In the presence of the completeness axiom, we will see that a surprising number of axioms can be 'thrown away' (i.e. can be proved from the remaining axioms). This talk should be accessible to all mathematics faculty as well as advanced undergraduates with a background in real analysis.