MATHEMATICS Colloquium 2022

Geometry of Octonions
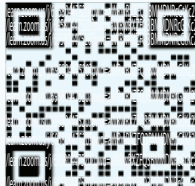
WED, 02 MAR
12 pm - 1 pm

To Join Virtually Click Here

Kalpa Madhawa
B.Sc.(Perad.), M.Sc. , Ph.D.(SIU,USA).

Kalpa Madhawa is an Assistant Teaching Professor of Mathematics at the Department of Mathematics, Widener University. He completed his PhD in 2021 at the Southern Illinois University, Carbondale, USA. He belive that Mathematics is an important tool for building and exploring concepts in many disciplines such as Physics, Computer Science, Chemistry, Biology, Economics, etc. His research interests lie in the field of Algebra, Geometry and Topology. Mainly, he study Clifford Algebras and applications of Octonions and Quaternions in Physics and Computer Science. He is a member of the American Mathematical Society and he recived the John M.H. Olmsted Outstanding PhD Teaching Assistant Award from the Southern Illinois University (2019-2020).

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Abstract

There are four division algebras over R, namely real numbers, complex numbers, quaternions and octonions. They can be used to represent a number of orthogonal groups. In particular, the groups SO(3) and SO(4) of rotations of 3 - and 4-dimensional spaces, respectively, can be described in terms of quaternions. We start with reviewing these cases and next turn to the groups of rotations of 7- and 8- dimensional spaces and describe them in terms of octonions. Since octonions form a non-associative division algebra, we use Moufang Identities to overcome the difficulty of some calculations and provide transformations that generate groups SO(7) and SO(8), which is an alternative description for these orthogonal groups.Aenean massa. Cum sociis natoque penatibus et magnis dis parturient elit montes, nascetur ridiculus mus. Donec quam felis. ultricies nec, pellentesque eu, pretium quis, sem.

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