1156-13-205 **Huy Tai Ha** (morey@txstate.edu) and **Susan Morey*** (morey@txstate.edu), Texas State University, 601 University Dr., San Marcos, TX 78666. *An Application of Rees Algebras to Graph Theory.*

In 1995 Rafael Villarreal determined the generators of the ideal of defining equations of the Rees algebra of the edge ideal of a graph in terms of the structure of the graph. In particular, the non-linear generators of the ideal of equations can be determined from the even closed walks of the graph. Detecting and enumerating cycles and circuits, both even and odd, is an interesting problem in graph theory. In this talk, an alternate description of the equations of the Rees algebra of an edge ideal will be given in terms of minors of a Jacobian dual matrix. Minor variations of this result provide an algorithm for enumerating all circuits (or cycles) of even length in a graph. An application to detecting directed cycles in digraphs will be given. (Received January 23, 2020)