



## Uniquely hamiltonian graphs

Professor Gordon Royle, University of Western Australia

Date: Thursday, Sep. 27, 2018

Time: 3:30-4:30pm

Venue: TR721, NIE

**Abstract:** A Hamilton cycle in a graph is a cycle passing through every vertex exactly once. Initially stimulated by connections to the 4-colour theorem, more than a century of research has produced a vast literature on the existence and enumeration of Hamilton cycles. Despite this, many fundamental questions about the existence of Hamilton cycles in certain classes of graphs remain unanswered. In this talk, I will focus on just one aspect of this research, namely the class of uniquely hamiltonian graphs, being graphs with exactly one Hamilton cycle. A famous proof of Tutte shows that there are no 3-regular (that is, every vertex has exactly 3 neighbours) uniquely hamiltonian graphs, because the existence of one Hamilton cycle forces the existence of at least two more. There are other classes of graphs for which similar results are known, and a number of tantalising conjectures that have resisted resolution for many years.

In this talk I will give a leisurely survey of the known results, outstanding conjectures and partial results. This talk will be expository in nature and no technical background other than familiarity with basic graph theory concepts (vertex, edge, path, cycle, regular graph, bipartite graph etc) is required of the audience.

**About the speaker:** Prof. Gordon Royle obtained his PhD at the University of Western Australia working on the computer enumeration of groups and graphs. After four years overseas at University of Waterloo, Canada and Vanderbilt University, USA, he returned to Western Australia to take up a position at the University of Western Australia. Initially in the Computer Science department, he moved to Mathematics and Statistics in 2008, but still teaches courses in either department as the need arises.

His research interests are primarily in graph theory, in particular algebraic graph theory, and he is coauthor of the well-received book "Algebraic Graph Theory" with Chris Godsil. He has also published a number of papers in matroid theory and a variety of loosely related topics such as permutation groups acting on graphs, finite geometry, and design theory. His most long-standing research interests however lie in the area of polynomials associated with graphs, in particular the chromatic and flow polynomials, and bounding the regions of the real line or complex plane in which their roots lie.

He is a current member, and former Director, of the research group "Centre for the Mathematics of Symmetry and Computation" at the University of Western Australia and is making his sixth visit to Singapore since 1977.

*All are Welcome!*