Emergent Research:
The PIMS Postdoctoral Fellow Seminar

Pacific Institute *for the* Mathematical Sciences

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Extensions of the Friendship Theorem

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ABSTRACT:
For r >/ 1, a graph has r-friendship property if every pair of vertices has exactly r common neighbours. The motivation for this definition is from the friendship theorem, which is on the graphs with 1-friendship property. The friendship theorem, first proved by Erdös, Rényi, and Sós in 1996, states that if G is a graph in which every pair of vertices has exactly one common neighbour, then G has a universal vertex v adjacent to all others, and the graph induced by V (G) \ {v} is a matching.

In this talk, we present a brief history of the problem, we study graphs with r-friendship property, where r >/ 2. We show all such graphs are strongly regular. Furthermore, we prove that for any r >/ 2, there are only finitely many graphs with r-friendship property. We provide some classes of strongly regular graphs with r-friendship property, and their connections to design theory. At the end, we discuss about some open problems and con- jectures on this topic.

This is an ongoing joint work with Karen Gunderson.

For more information and registration:
https://www.pims.math.ca/seminars/PIMSPDF

SPEAKER BIO:
Mahsa N Shirazi is a PIMS-CRG postdoctoral fellow at the University of Manitoba, under the supervision of Karen Gunderson. Her research is centered around using graph theory to answer questions that arise in design theory. Her current research project is on a special type of strongly regular graphs called r-friendship graphs. She is also interested in EKR problems on different mathematical objects, like perfect matchings and uniform set-partitions. She is also interested in Matrix theory and linear algebra. She completed her Ph.D. at the University of Regina under the supervision of Shaun Fallat and Karen Meagher.

ABOUT PIMS PDF SEMINARS:
PIMS ongoing lecture series featuring our Postdoctoral Fellows every three weeks. You will have the opportunity to connect with emerging research in the mathematical sciences from a PIMS Postdoctoral Fellow. PIMS PDFs are amongst the top young researchers in Canada, and this is an excellent opportunity to learn about them, and their work.