Title: Inverses of non-bipartite unicyclic graphs.

Abstract: This talk is about inverses of non-bipartite unicyclic graphs with a unique perfect matching. This talk answers whether the inverse graph of a non-bipartite unicyclic graphs with a unique perfect matching is also non-bipartite. Like bipartite case, we see that the inverse graph of a nonbipartite unicyclic graph U with a unique perfect matching is isomorphic to itself if and only if Uis a simple corona. Furthermore, we see the class of non-bipartite unicyclic graphs with a unique perfect matching which possess bicyclic inverses.

- S. Akbari and S. J. Kirkland, On unimodular graphs, *Linear Algebra and its Applications*, 421 (2007) 3-15.
- 2. R. B. Bapat, Graphs and Matrices, Hindustan Book Agency, Delhi, 2010.
- R. B. Bapat and J. W. Grossman and D. M. Kulkarni, Generalized matrix tree theorem for mixed graphs, Linear and Multilinear Algebra, 46 (1999) 299-312.
- R. B. Bapat, S. K. Panda and S. Pati, Self-inverse unicyclic graphs and strong reciprocal eigenvalue property, *Linear Algebra and its Applications*, 531 (2017) 459-478.
- S. Barik, M. Neumann and S. Pati, On nonsingular trees and a reciprocal eigenvalue property, *Linear and Multilinear Algebra*, 54 (2006) 453-465.
- 6. F. Buckley, L. L. Doty, F. Harary, On graphs with signed inverses, Networks, 18 (1988), 151-157.
- 7. C. D. Godsil, Inverses of trees, Combinatorica, 5 (1985) 33-39.
- 8. F. Harary, The determinant of the adjacency matrix of a graph, Siam Review, 4 (1962) 202-210.
- F. Harary and H. Minc, Which Nonnegative Matrices are Self-Inverse?, Mathematics Magazine, 49 (1976), 91-92.
- D. Kalita and K. Sarma, Inverses of non-bipartite unicyclic graphs with a unique perfect matching, Linear and Multilinear Algebra, accepted, 15 August, 2020.
- S. K. Panda, Unicyclic graphs with bicyclic inverses, Czechoslovak Mathematical Journal, 67 (2017), 1133-1143.
- S. K. Panda and S. Pati, Inverses of weighted graphs, *Linear Algebra and its Applications*, 532 (2017), 222-230.
- S. K. Panda and S. Pati, On the inverse of a class of bipartite graphs with a unique perfect matchings, Electronic Journal of Linear Algebra, 29 (2015), 89-101.
- S. K. Panda and S. Pati, On some graphs which possess inverses, *Linear and Multilinear Algebra*, 64 (2016), 1445-1459.
- S. Pavlkov and J. K. Jedin, On the inverse and the dual index of a tree, *Linear and Multilinear Algebra*, 28 (1990), 93-109.
- R. M. Tifenbach and S. J. Kirkland, Directed intervals and the dual of a graph, *Linear Algebra and its* Applications, 431 (2009), 792-807.
- D. Ye, Y. Yang, B. Mandal and D.J. Klein, Graph invertibility and median eigenvalues, *Linear Algebra and its Applications*, 513 (2017) 304-323.
- 18. Y. Yang and D. Ye, Inverses of bipartite graphs, Combinatorica, 38 (5) (2018) 1251-1263.