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## RATIONAL REALIZATION OF NONZERO EIGENVALUES FOR SYMMETRIC MATRICES OF TREES AND TREE SIGN PATTERNS

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**Abstract of Talk:** A tree sign pattern is a sign pattern matrix whose graph is a tree. Let  $\mathcal{S}^\ell$  be the set of symmetric matrices of a given tree or tree sign pattern. We construct a rational matrix in  $\mathcal{S}^\ell$  with a specified nonzero rational eigenvalue in those cases where it is possible (trees with at least one edge). We address separately the case in which the tree or tree sign pattern contains a loop and the case in which it does not.

The research was conducted at Iowa State University's Research Experience for Undergraduates with Atoshi Chowdhury under Professor Leslie Hogben and graduate student Rana Mikkelsen.