

**Title:** Fat Hoffman graphs with smallest eigenvalue at least  $-1 - \tau$   
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**Abstract:** In the field of Spectral Graph Theory, one of the important research problem is to characterize graphs with bounded smallest eigenvalue. P. J. Cameron, J. M. Goethals, J. J. Seidel, and E. E. Shult (1976) characterized graphs whose adjacency matrices have smallest eigenvalue at least  $-2$  by using root systems. Their results revealed that graphs with smallest eigenvalue at least  $-2$  are generalized line graphs, except a finite number of graphs represented by the root system  $E_8$ . A. J. Hoffman (1977) studied graphs whose adjacency matrices have smallest eigenvalue at least  $-1 - \sqrt{2}$  by using a technique of adding cliques to graphs. R. Woo and A. Neumaier (1995) formulated Hoffman's idea by introducing the notion of Hoffman graphs and generalizations of line graphs.

In this talk, we show that all fat Hoffman graphs with smallest eigenvalue at least  $-1 - \tau$ , where  $\tau$  is the golden ratio, can be described by a finite set of fat  $(-1 - \tau)$ -irreducible Hoffman graphs. In the terminology of Woo and Neumaier, we mean that every fat Hoffman graph with smallest eigenvalue at least  $-1 - \tau$  is an  $\mathcal{H}$ -line graph, where  $\mathcal{H}$  is the set of isomorphism classes of maximal fat  $(-1 - \tau)$ -irreducible Hoffman graphs. It turns out that there are 37 fat  $(-1 - \tau)$ -irreducible Hoffman graphs, up to isomorphism. (This is joint work with Akihiro Munemasa and Tetsuji Taniguchi.)