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C Marijuán and **M Pisonero*** (mpisonero@uva.es). *Eigenvalues of Symmetric Nonnegative Matrices of Small Order*. Preliminary report.

The SNIEP (Symmetric Nonnegative Inverse Eigenvalue Problem) is the problem of characterizing all possible real spectra of entrywise symmetric nonnegative matrices. When the symmetric condition is omitted the problem is named as the RNIEP (Real Nonnegative Inverse Eigenvalue Problem). A (symmetric) nonnegative matrix can be seen as the adjacency matrix of a weighted (graph) digraph. In this talk we make a brief historical overview of both problems applied to graphs and we mention that they remain open for families of size greater than or equal to 5. The first result on the RNIEP is from Suleimanova in 1949 and it is a sufficient condition, while the origin of the SNIEP is due to Fiedler in 1974. Hershkovich, in his thesis in 1978, raises the question whether both problems, RNIEP and SNIEP, are the same. It took until 1996 when Johnson, Laffey and Loewy proved that the two problems are different. It is known that for lists of size less than or equal to 4 the RNIEP and the SNIEP are equivalent problems, and Egleston, Lenker and Narayan in 2004 proved that for lists of size 5 they are different. We focus on the SNIEP in small dimensions and we give the characterizations that are known, as well as the matrices that have these families as spectrum. (Received September 13, 2020)