and the spectrum, despite the symmetry of the problem, contains no degeneracies. Take now the eigenvalues corresponding to a definite symmetry-class, for instance

![Graph](image1.png)

Fig.IV.4 - Results of level fluctuations for the first 810 eigenvalues of a membrane whose boundary is a stadium. They correspond to eigenfunctions with odd-odd symmetry (see Fig.IV.1). The ratio \(2a/R\) of the straight line segment to the radius is 1 (see Fig.III.21a). See caption of Fig.IV.2 for further explanations (taken from [Sc-84, BGS-84b]).

![Graph](image2.png)

Fig.IV.5 - Same as in Fig.IV.4 but with the four different symmetry classes, as specified in Fig.IV.1. The spectrum analyzed contains the first 3200 eigenvalues. See caption of Fig.IV.2 for further explanations (taken from [Sc-84, BGS-84b]).

the odd-odd case. Results are presented on Fig.IV.4 and Table IV.1. Again we have a remarkable agreement with GOE-predictions. A similar agreement is obtained when analyzing the eigenvalues belonging to the other three symmetry classes. Consider finally the spectrum which contains all levels corresponding to the four symmetries of the stadium (IV-6,6',6",6""). The results change drastically. They are shown on Figs.I.7b, IV.5 and Table IV.1. The spectrum fluctuations are intermediate between GOE and Poisson. The results would be closer to Poisson-fluctuations if more than four different families characterized by different quantum numbers would be present. This is in exact analogy with what happens when superposing several different GOE spectra. Or with compound nucleus resonances, when no attention is payed to quantum numbers and the spectrum results from mixing several pure series.