suitably chosen fitting box around the targeted peak (n, l, m). Since the MPTS method operates directly upon of all the $2l + 1$ modes in a multiplet (n, l), $2l + 1$ sets of modal parameters are obtained simultaneously for that multiplet (n, l). By simply averaging all of the $2l + 1$ frequency estimates within a multiplet, the average frequency for that multiplet is obtained, which is called the "mean-multiplet frequency". In addition, by fitting an appropriate polynomial to the run of the fitted frequencies versus m, the frequency-splitting coefficients for that multiplet are estimated, and are used for the correction of the leakage matrix for that multiplet by calculating the expansion coefficients B_2 and B_4 of the solar differential rotation.

In the following we will use the term "MPTS" when we are referring to the MPTS method.

2.2. *Fitting methodology of Schou and Larson*

The fitting methodology of Schou and Larson is mainly based on the doctoral thesis of Schou (1992) and was further developed in the work of Larson & Schou (2015) and Larson & Schou (2018) (see also the errata ???). In contrast to all other fitting methodologies described in this paper, the methodology of Schou and Larson fits the Fourier transforms of all values of m for a given multiplet (n, l) simultaneously using a maximum likelihood technique. A leakage matrix is used that allows leaks from other multiplets to be taken into account and correlations between individual spectra induced by the leaks to be determined. This is unlike to other methods, where the phase information is disregarded and the leaks are only taken into account in a more statistical sense. The line width of the $2l + 1$ modes within the multiplet (n, l) is assumed to be independent of the azimuthal order m, while the relative variation of the mode amplitudes with m is assumed to be given by the leakage matrix which is corrected, according to the theory of Woodard (1989), for the distortion that is caused by the solar differential rotation. This correction of the leakage matrix is done for each multiplet (n, l) by calculating the expansion coefficients B_2 and B_4 of the solar differential rotation from the frequency-splitting coefficients obtained for that multiplet. Initially, the algorithm fits for a total of six frequency-splitting coefficients, then for 18 and 36 once the 6-term fits have converged. The leaks are held fixed during the fit for the target mode. The asymmetry of the line profiles is taken into account by using an asymmetrical profile that is derived by a generalization of the profile of Nigam & Kosovichev (1998). This way undesirable properties of the profile of Nigam & Kosovichev (1998) are avoided, viz. its invalidity far from the mode frequency and the non-boundedness of its integral over all frequencies (Larson & Schou 2015).

In the following we will use the term "LS" when we are referring to the fitting methodology of Schou and Larson.

2.3. *Fitting methodologies of Korzennik*

The high-degree fitting methodology of Korzennik et al. (2004) is applicable to modes with degrees in the range from $l \gtrsim 100$ (p-modes) to $l \gtrsim 200$ (f-modes). Its basic idea consists of correcting for the bias introduced when fitting a ridge of power at high degrees. For this purpose, a detailed model of the underlying modes that contribute to the distribution of power in a ridge was developed to generate synthetic ridges, which are then fitted using the same methodology employed to fit the observations. Hence, the results of fitting these synthetic data allow the user to derive a measure of the bias between the ridge properties and those of the underlying targeted mode used in the modeling. By means of this measure the results from fitting an observed ridge can be corrected to derive the unbiased properties of the underlying targeted mode.

In the following we will use the term "SKh" when we are referring to the high-degree fitting methodology of Korzennik.

In Korzennik (2005, 2008a,b) a separate medium-degree fitting method has been developed which is applicable to modes with degrees in the range $0 \leq l \leq 300$, and has been optimized for very long helioseismic time series. This methodology includes an optimal sine multi-taper spectral estimator, the complete leakage matrix, i.e. horizontal as well as vertical components, the asymmetric profile of Nigam & Kosovichev (1998), and the simultaneous fitting of individual profiles at all the azimuthal orders m of a given multiplet (n, l). The contamination by nearby modes (n', l') within the fitting range is also included. Since simultaneous fitting of these contaminants is impractical, the fitting procedure is iterated, i.e. the characteristics of the contaminants used in the fitting correspond to the values fitted at the previous iteration. The leakage matrix coefficients are corrected for the distortion caused by the solar differential rotation, following the formalism of Woodard (1989). The differential rotation is characterized by the expansion coefficients $B_2 = -0.07712$ and $B_4 = -0.04396\,\mathrm{nHz}$ (Korzennik 2023).

In the following we will use the term "SKm" when we are referring to the medium-degree fitting methodology of Korzennik.