APPLYING THE BACKUS-GILBERT THEORY TO APPROXIMATION

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Several years ago I showed how to apply the Backus-Gilbert theory, one of the important methods for solving inverse problems related to the determination of elastic or electro-magnetic properties of the Earth's interior and various other problems to the interpolation of functions in general, when the given values of the considered functions are not bounded functionals. The lecture described in this abstract contains further developments of both ways in which one may apply the Backus-Gilbert method: **continuous version** consisting in using the classical Backus-Gilbert theory for finding minimal averaging kernels based on building linear combinations of the elements of a δ-sequence, followed by restoring the exact data through a limit process; **finite version** of the Backus-Gilbert process built by a step by step analogue of the classical version using the same data, different from other discretization processes like the so called "Discrete Backus-Gilbert Inversion" (DBGI) used in remote sensing problems to compute numerically the needed integrals. Both approaches lead to **Shepard approximation formula** and also to its generalization, **the moving least squares process**. The analysis emphasizes the role of the **Backus-Gilbert spread** in approximating the considered functions and providing minimal spread i.e. maximal "deltaness" results, error evaluations and convergence criteria.