

Part IV

Further Applications

In the last part of the book, we give brief overviews over some further applications where the method of approximate inverse has led to efficient solution schemes. Chapter 16 introduces to the problem of X-ray diffractometry, which is a method of non-destructive testing where one is interested in detecting the stress tensor of a given probe using X-ray measurements. Chapter 17 is concerned with the three-dimensional thermoacoustic computerized tomography (TCT). This is an inverse problem with applications in medical imaging and non-destructive testing, which is related to the SONAR problem investigated in Part III. Here, the center sets of the spherical mean operator are spheres and the approximate inverse leads to a stable inversion scheme of filtered backprojection type. In Section 2.2, we already dealt with the problem of 2D computerized tomography. In Chapter 18 we show how the method of approximate inverse can be used to compute reconstruction kernels in 3D computerized tomography when the X-ray sources lie on a curve.