Wavelet regularization for the Cauchy problem of fractional Helmholtz equation

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This talk is devoted to the solution of the Cauchy problem related to fractional Helmholtz equation. Since this problem is ill-posed, a regularization method is needed to overcome the ill-posedness. For this task, we combine two powerful tools that are Fourier transform and wavelet filtering. To regularize this problem with noisy measured data, we use Meyer wavelet with a suitable level of approximation, as a low-pass filter to remove high frequencies which cause the ill-posedness. Then we transform the problem to frequency space to solve it by Fourier transform. In practical examples we use fast Fourier transform that makes the method very fast and effective. An analytic discussion, indicates the convergence of the method rather than a numerical implementation is proposed in details.

References:

[1] H. Lotfinia, N. Chegini, and R. Mokhtari. Meyer wavelet regularization for the Cauchy problem of the bi-Helmholtz equation. Under Review.

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