

Correct A Priori Information Modelling for Sparse MRI Reconstruction

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Magnetic Resonance Imaging (MRI) is widely used in many imaging applications. For some applications as dynamic [1] or pediatric [2] MRI it is very important to have short scan times but the data acquisition in MRI is inherently sequential so that the data acquisition can become rather lengthy. The proposed solutions to speed up the acquisition are to acquire more data at the same time with several coils (parallel MRI) [3] or to omit “unnecessary” measurements and replace them by a priori knowledge of the object under investigation (sparse MRI) [4]. Although MRI images consists of complex numbers, the a priori information is often motivated by magnitude images but priors based on complex numbers are then implemented. Better modelling of the a priori knowledge is based on a different parametrization in terms of magnitude and phase [5] and we analyse the resulting new data term. The numerical results using both parallel and sparse MRI show that with this modification images with a lot less artefacts can be reconstructed. Therefore, even less data is needed when the prior information is stated properly.

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