1154-62-2046 **Angel R Pineda*** (angel.pineda@manhattan.edu), Department of Mathematics, Manhattan College, 4513 Manhattan College Parkway, Riverdale, NY 10471. *Optimizing constrained reconstruction in magnetic resonance imaging for signal detection.*

Constrained reconstruction in magnetic resonance imaging (MRI) allows the use of prior information through constraints to improve the reconstructed images. Constrained reconstruction leads to images which appear clearer than reconstructions without constraints but because the methods are typically non-linear, the reconstructed images have artifacts whose structure is hard to predict. In this work, we compared different methods of optimizing the regularization parameter using a total variation constraint in the spatial domain and sparsity in the wavelet domain for one-dimensional (2.56x) acceleration using variable density under-sampling. We compared the mean squared error (MSE), structural similarity (SSIM) and the area under the receiver operating characteristic (AUC) using a linear discriminant for detecting a small and a large signal with a signal-known-exactly (SKE) task with varying backgrounds. Our results show that the AUC dependence on regularization parameters depend on the imaging task (i.e. the signal being detected). We also found that a model-based reconstruction enforcing data agreement with no prior information did statistically as well as models which included total variation or wavelet sparsity. (Received September 17, 2019)