DESIGN OF MEASUREMENT MATRIX IN COMPRESSED SENSING BY HYPERSECANT SIGNALS AND APPLICATION IN FAST MRI ACQUISITION

Pham Thi Hong Nhung

QH-2007-I/CQ, Electronics and Telecomunications Technology

Abstracts:

This thesis presents the application of hypersecant pulses and compressive sensing techniques in fast magnetic resonance imaging (MRI) acquisition. The first chapter of the thesis presents the technical knowledge of the excitation by hypersecant pulses and MRI acquisition. In there, the general principles of magnetic resonance imaging, the pulse characteristics and using hypersecant pulses in MRI are given. That we can see the advantages of the using hypersecant pulse in MRI is excitation and resonance signal reception seems to simultaneously increase the speed and imaging receivers. The second chapter focuses on understanding compressed sampling (CS) - a new method for sampling signals, where the sampling frequency does not follow the law of the Shannon Nyquist sampling, however, credit can still be restored by L1-minimization techniques. Giving all the requirements about measurement matrix used for CS and presented for how to applicate of pulse hypersecant in designs measurement matrix in CS. The final section covers how to apply the combined use of CS in MRI pulse hypersecant, gives some simulation results using MATLAB as a program modulation a brain image original with hypersecant pulse and use CS to data sampling, image recovery. Since asserting that it is possible to use CS with hypersecant pulse and number of samples to be taken much smaller conventional methods that can restore the data and create accurate images.

Key word: *MRI, hypersecant pulses, compressive sensing, fast MRI acquisition.*