NMR Signal Processing based on SVD and Wavelet Transform

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In recent, some interesting new techniques for the signal processing have been developed to improve a S/N ratio and suppress unwanted large signal like a water peak in NMR spectrum. Singular value decomposition (SVD) calculation provide us with intensity matrix and phase related matrix. We can suppress large peaks and reduce noise by modifying the intensity matrix and attempting the phase correction using matrices correspond to phase. As another method of signal processing, Wavelet transform have two main stream, discrete wavelet transform(DWT) and continuous wavelet transform(CWT). Some techniques have been developed for the noise reduction process by using DWT, and lately peak suppression and phase correction methods were studied by using CWT. We developed methods of noise reduction and large peak suppression by SVD, DWT and CWT in our NMR data processor, HyNMR. SVD based methods necessitate long runtime, because large matrix calculation, and effective on large peak suppression. However, the wavelet transform based methods have nice performance on both noise reduction and peak suppression, and short runtime.