

Analysis of hearts sounds based on continuous wavelet transform

Abstract

This paper presents the application of wavelet transform analysis method to the heart sounds signal. The heart sounds is a non-stationary signal, thus it is very important to study the frequency and time information. One of the time-frequency analysis methods is short time Fourier transforms. However, the STFT analysis is limited by the time and frequency resolution. The wavelet transform was introduced to curb the resolution problem in STFT. The wavelet transform is a multi-resolution time-scale analysis that gives high resolution for low frequency components and low resolution for high frequency components. Since majority of heart sounds component lies in low frequency, thus the application of wavelet transform to heart sounds is very suitable. Results in time-frequency representation clearly show that the wavelet transform is capable to distinguish between the normal with a few types of abnormal heart sounds. The murmurs caused by particular heart diseases such as aortic regurgitation, aortic stenosis, mitral regurgitation, mitral stenosis, pulmonary regurgitation and tricuspid regurgitation were clearly shown under continuous wavelet representation.