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Time-Frequency Analysis of Femoral and Carotid Arterial Doppler Signals

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Abstract :

In this study, the short time *Fourier* transform, continuous wavelet transform (CWT) and *S-transform* have been used for spectral analysis of the carotid and femoral arteries Doppler signal. Each of these methods can represent the temporal evolution of Doppler spectra know as the sonograms. Time-frequency analysis by S-transform presents a linear resolution that surpasses the problem of Fourier Transform by a slipping window (STFT) of fixed length and also corrects phase concept in the wavelet transform for the analysis of non-stationary signals. This transform provides a very suitable space for extracting features and the localization of discriminating information in time and frequency in Doppler ultrasonic signals. The sonograms have been then used to compare the methods in terms of their frequency resolution and effects in determining the stenosis of carotid and femoral arteries.

Keywords

STFT, CWT, S-transform, Doppler ultrasound, femoral arterial, carotid arterial.

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