

Abstract Submitted
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Non-Invasive Measure of Stenosis Severity Through Spectral Analysis WINROSE MOLLEL, ALEXANDRA SINSON, COLETTE SCHEFFERS, TAIKANG NING, CLAYTON BYERS, Trinity College — This research focused on spectral analysis of the sound signal produced by valve stenosis. The physical system mimicked the measurement of a human pulse using a stethoscope. Contact microphones attached to the outside of a pipe collected sound signals produced when the cross-sectional area of the pipe was reduced to 20% and 30% of the initial cross-sectional area. Water was pumped at a frequency of 1Hz and a flow velocity of 0.45m/s to maintain a Reynolds number that approximates blood flow of the heart, which is about 6400. Power spectra for the 20% and 30% restrictions showed an increase in the energy content of the sound signal across all frequencies. In addition to the overall increase, the 30% restriction power spectrum was made up of 3 peaks centered around 33Hz, 43Hz and 100Hz while the 20% restriction power spectrum had four distinct peaks centered around 20Hz, 48Hz, 84Hz and 165Hz. This clear difference between the three power spectra indicates a positive relationship between stenosis severity and frequency produced, and forms the basis for further study of the relationship.

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