

N. S. Manigandan, Development of hardware for impedance cardiography, M. Tech. Thesis, Department of School of Biosciences & Bioengineering, Indian Institute of Technology Bombay, 2004.

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Abstract - Impedance cardiography is a non-invasive technique for measuring cardiac output and for diagnosing cardiac disorders. The basal impedance of human thorax is normally 20-30 Ω and it decreases by 0.1-0.2 Ω . During systole, blood pumped into the thoracic region decreases the impedance. This change in the thoracic impedance is sensed by injecting a high frequency (20-100 kHz) current (< 5 mA) into the thoracic region through a pair of electrodes and by measuring the voltage across another pair of electrodes. The impedance variation thus measured is known as impedance cardiogram (ICG) and can be used for estimating stroke volume by using appropriate models of blood flow and can also be used for diagnostic information. This project involved developing an instrument to acquire the impedance cardiogram. The various signals that can be acquired from the instrument are basal impedance, impedance variation signal, and its derivative, and differentiated ECG (sensed from the same electrodes). Also a thoracic impedance simulator was developed for comprehensive testing and calibration of the impedance cardiograph instrument to ensure proper signal pick-up and detection of impedance variation.