

Abstract Submitted  
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**Systolic Intrinsic Frequency and Various Measures of Left Ventricle Contractility.** NIEMA PAHLEVAN, Department of Aerospace Mechanical Engineering, University of Southern California — There has been growing interest during past six decades to introduce new indices for quantifying left ventricular (LV) contractility. We have recently introduced a new method, called intrinsic frequency (IF), for analyzing the dynamics of systemic circulation. IF method models LV and arterial network as an object rotating around an origin where the angular velocity of the rotation during systole (when LV and arterial network are coupled) and diastole (when arterial network is decoupled) are intrinsic frequencies,  $\omega_1$  and  $\omega_2$  respectively.  $\omega_1$  and  $\omega_2$  can be extracted from a carotid pulse waveform using IF method. In this study, Huntington Medical Research Institutes heart study data have been used to compare  $\omega_1$  with various measures of LV contractility such as ejection fraction, mean velocity of circumferential fiber shortening, LV end-systolic meridional wall stress, and maximal LV power corrected for end-diastolic volume. Here, LV contractility indices were computed noninvasively from cardiac MRI and tonometry data. The results indicate that  $\omega_1$  can be used as a surrogate of LV contractility. This is clinically significant since  $\omega_1$  can be accurately obtained by a standard iPhone camera.

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