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Inharmonicity Analysis: A Novel Physical Method for Acoustic Screening of Dysphonia SAM MATTESON, FANG-LING LU — In the United States 6.8% of men, women, and children report current voice problems and approximately 29% will report some problems during their lifetime. Often this dysphonia is due to pathologies of the vocal folds. The authors (a physicist and a speech pathologist) describe an interdisciplinary approach that shows promise of detecting physiological abnormalities of the vocal folds from an analysis of the Fourier spectrum of spoken “tokens.” The underlying principle maintains that the normal human vocal fold is a linear oscillator that emits overtones that are very nearly precise integral values of the fundamental. Physiological problems of the vocal folds, however, introduce mechanical non-linearities that manifest themselves as frequency deviations from the ideal harmonic (that is, integral) values. The authors quantify this inharmonicity, describing and illustrating how one can obtain and analyze such data. They outline, as well, a proposed program to assess the clinical sensitivity and significance of the analysis discussed in this work.

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