Nonlinear Dynamics of the Voice

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The voice is a highly nonlinear system of coupled oscillators.
Consequently, nonlinear dynamics provides the appropriate
framework to understand the normal voice, register transitions, and
voice pathologies. The basic terms of nonlinear dynamics
such as phase space, attractors nad bifurcations are
introduced briefly. Fortunately, many information about
attractors and bifurcation can be deduced from conventional
narrow-band spectrograms. Examples of bifurcations in newborn
cries, voice pathologies, and animal vocalizations are shown.
Furthermore, bifurcation diagrams of the asymmetric two-mass
model and excised larynx experiments are presented. Model
simulations are compared with high-speed recordings
of voice patients with unilateral paralysis.