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**Multivariable analysis of energy decay in coupled volume rooms:**  
**How can we objectively describe what we perceive in coupled**  
**volume performance spaces?**

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The behavior of coupled volumes in room acoustics is commonly characterized by multiple slopes observed in sound energy decay curves, as measured (or modeled) using an omnidirectional receiver. This characterization is often limiting and can not adequately explain the change in character of sound energy decay with time that we perceive as listeners in music performance spaces that employ coupled volumes. By investigating energy decay as a function of several independent variables, including time, frequency, and direction of energy arrival, we seek to forge new objective measures that relate to what a listener actually hears in a coupled volume concert hall. We will discuss relevant geometry and materials of several coupled volume performance spaces designed by Artec Consultants Inc, describe subjective phenomena we have observed in these halls, and present results of our ongoing investigation of new objective metrics geared to better characterize coupled volume music performance spaces.