



Two-Voice Frameworks and the Harmonization of Indian Ragas

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The present paper develops topics in a previous paper by Morris and Ravikiran¹ that surveys some of the technical possibilities of raga harmonization in Carnatic music. We study some properties of Carnatic and Hindustani ragas that permit the construction of two-voice polyphonic frameworks. Similar frameworks have been used in western common practice music and jazz to provide a polyphonic base for the harmonization of melodic lines; our two-voice frameworks can similarly function to enable the harmonization of melodies based on different ragas.

An important raga attribute is its underlying scale. Ragas may have from 4 to 12 notes, but the norm is 7 taken out of the 12 chromatic pitch-classes. Various frameworks are formed by superimposing a raga scale upon itself under transposition and/or inversion. We are interested in cases where a framework satisfies a verticality condition (VC), so that—in this paper—the framework's vertical intervals form only unison/octaves, thirds of 3 or 4 semitones, and/or sixths of 8 or 9 semitones.

The paper shows how to construct frameworks with VC using simple hand-algorithms based on principles from mathematical combinatorics and scale theory. It concludes with examples of how the frameworks are used to harmonize contrasting ragas.

¹ Morris, Robert and Chitravina N. Ravikiran, "Ravikiran's Concept of Melharmony: An Inquiry into Harmony in South Indian Ragas", *Music Theory Spectrum*, 28/2 (2006): 255-76