MODELING OF BAND OVERLAP IN GAS MIXTURES
WITH THE SMOOTHED (RE-ORDERED) BAND MODEL

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ABSTRACT. The smoothed band model (also called the re-ordered band model) shows promise of providing the foundation for a radiant analysis method for enclosures containing participating gases. Currently the method is restricted to gases having only one participating component, but practical enclosures often contain gases, like the products of combustion, having more than one participating component. This paper addresses the problem of extending the smoothed band method to multi-component gas mixtures. By analogy with what is done for overlapping lines inside a single band, it is proposed that the absorption coefficients of the individual smoothed bands should be simply added to get the absorption spectrum of the complete mixture. Comparisons with the predicted total gas emissivity correction with various total gas emissivity models in the literature were used to test this "additive smoothed-band" model. It was concluded that the model is not inconsistent with the predictions of the other models, and it is felt that it can be safely adopted for future modeling.