

## EVALUATION OF NEW ALBDF FUNCTIONS BASED ON H<sub>2</sub>O AND CO<sub>2</sub> MIXTURES FOR VARIABLE MOLE FRACTION RATIO USING THE TWO-WAY ANOVA ANALYSIS

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**ABSTRACT.** In the present work new absorption line blackbody distribution functions (ALBDF) are generated based on H<sub>2</sub>O and CO<sub>2</sub> mixtures for a wide range of mole fraction ratio ( $MR$ ). The proposed methodology is compared with the conventional multiplication approach in the framework of the rank correlated spectral line-based weighted-sum-of-gray-gases model (SLW-RC). The line-by-line (LBL) solution is used as benchmark to evaluate both approaches accuracy in test cases representative of oxy-fuel combustion conditions. A two-way ANOVA analysis is carried out to achieve the differences between the methodologies and in the definition of the arbitrary value of reference blackbody source temperature  $T_b$  for the SLW-RC model. Results of radiative heat source shows that the proposed methodology leads to lower mean normalized errors than the conventional multiplication approach and that the definition of the  $T_b$  as the spatially averaged temperature is the optimal choice to compute the SLW-RC parameters.

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