

# **$L$ -FUNCTION FOR $\mathbf{Sp}(4) \times \mathbf{GL}(2)$ VIA A NON-UNIQUE MODEL**

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ABSTRACT. The theory of  $L$ -functions of automorphic forms or automorphic representations is a central topic in modern number theory. A fruitful way to study  $L$ -functions is through an integral formula, commonly referred to as an integral representation. The most common examples of Eulerian integrals are the ones which unfold to a unique model such as the Whittaker model. Integrals which unfold to non-unique models fall outside of this paradigm, and there are only a few such examples which are known to represent  $L$ -functions. In this talk, we prove a conjecture of Ginzburg and Soudry [IMRN, 2020] on an integral representation for the tensor product partial  $L$ -function for  $\mathbf{Sp}(4) \times \mathbf{GL}(2)$  which is derived from the generalized doubling method of Cai, Friedberg, Ginzburg, and Kaplan. We show that the integral unfolds to a non-unique model and analyze it using the New Way method of Piatetski-Shapiro and Rallis.