Explicit description of hypergeometric motives for Delsarte K3 surface pencils

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Abstract: This talk describes joint work with Charles Doran, Tyler Kelly, Steven Sperber, John Voight, and Ursula Whitcher. We study the hypergeometric functions associated with five one-parameter deformations of K3 quartic hypersurfaces in projective space, each admitting a symplectic group action. We match the Picard-Fuchs differential equations to factors of the zeta function, and we write the result in terms of global L-functions. We obtain a complete, explicit description of the motives for these pencils in terms of hypergeometric motives. Finally, we describe generalizations to a broader class of K3 hypersurfaces.