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INCOMPLETE LIPSCHITZ-HANKEL INTEGRALS OF ANGER AND WEBER FUNCTIONS

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ABSTRACT. Representations in terms of Kampé de Fériet functions are derived for certain generalized hypergeometric integrals. These are then used to obtain representations for incomplete Lipschitz-Hankel and related integrals of Anger and Weber functions. Reduction formulas for the associated Kampé de Fériet functions may then be employed to reduce special cases of the resulting Lipschitz-Hankel integrals to simpler generalized hypergeometric functions. In addition, four new reduction formulas for the Kampé de Fériet functions associated with incomplete Lipschitz-Hankel integrals of Anger-Weber functions are given.

1. Introduction. An integral having the form

$$C_{e_{\mu,\nu}}(a,z) \equiv \int_0^z \exp(at) t^\mu C_\nu(t)\, dt$$

where $C_\nu(t)$ is a cylindrical function or an associated Bessel function is called a Lipschitz-Hankel integral if $z = \infty$, and if $|z| < \infty$, then it is called an incomplete Lipschitz-Hankel integral.

In a series of recent papers, see [**3**] through [**9**], the author has given representations for incomplete Lipschitz-Hankel and related integrals of Bessel functions $J_\nu(t)$, modified Bessel functions $I_\nu(t)$, Hankel functions $H_\nu^{(1)}(t)$ and $H_\nu^{(2)}(t)$, Macdonald functions $K_\nu(t)$, Neumann functions $Y_\nu(t)$, Struve functions $\mathbf{H}_\nu(t)$ and modified Struve functions $\mathbf{L}_\nu(t)$.

This program shall now be completed in the present paper by deriving representations in terms of Kampé de Fériet functions for incomplete Lipschitz-Hankel and related integrals of Anger functions $\mathbf{J}_\nu(t)$ and Weber functions $\mathbf{E}_\nu(t)$. To this end, we define the following functions

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