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Jonathan M. Borwein and **Armin Straub*** (astraub@tulane.edu), 6823 St. Charles Avenue, New Orleans, LA 70118. *Symbolic evaluation of log-sine integrals in polylogarithmic terms.*

Generalized log-sine integrals, first studied systematically by Lewin 50 years ago, appear in many settings in number theory and analysis: for instance, they can be used to express classes of inverse binomial sums. As such they have reappeared in recent work on the epsilon-expansion of Feynman diagrams in physics; they have also proved useful in the study of certain multiple Mahler measures. We sketch these developments and present results which allow for the symbolic computation of log-sine integrals in terms of Nielsen polylogarithms at related argument. In particular, log-sine integrals at $\pi/3$ are shown to evaluate in terms of polylogarithms at the sixth root of unity. (Received September 04, 2011)