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Brian L Miller* (brian.l.miller@ttu.edu). *Integration and Primary Decomposition.*

We provide an algorithm to compute the logarithmic part of an integral in which the integrand lies in a tower of transcendental elementary extensions followed by an algebraic extension. Computing the logarithmic part of an integral in a transcendental elementary has been given by Bronstein. However, computing the logarithmic part in an algebraic extension has remained difficult. We offer an algorithm that utilizes primary decomposition and Gröbner bases. We are also able to give an explicit bound for the termination of the algorithm. (Received July 28, 2011)