Technique of Lazarus Fuchs
for Solving Rational First-Order Differential Equations

Roger Chalkley, December 26, 2014

I discovered in 1993 that there are numerous first-order differential for which the DSolve command of Mathematica is not helpful even though the equations can be transformed to a more amenable form by a transformation that Lazarus Fuchs described in 1884. For a modern presentation showing how to use the transformation of Lazarus Fuchs with numerous examples, see my paper titled Lazarus Fuchs’ Transformation for Solving Rational First-Order Differential Equations, Mathematical Analysis and Applications, Volume 187 (1994), pages 961-985, of which a copy may be obtained by clicking here. In particular, page 983 of this paper lists 132 first-order algebraic differential equations for which the transformation of Lazarus Fuchs is quite useful even though the DSolve command of Mathematica provides no help at all.