SOLVING ORDINARY DIFFERENTIAL EQUATIONS BY EQUIVALENCE TRANSFORMATIONS

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We present an effective algorithmic method for characterizing equivalence classes of ODEs and for the computation of equivalence transformations. For second order ODEs, one can use invariants which were found by Arthur Tresse in 1896. We will illustrate the method for Emden-Fowler equations $y'' = Ax^n y^m$, showing how certain second order ODEs that are equivalent to Emden-Fowler equations with known solution can be solved algorithmically.