

[gex20] Second ODEs reducible to first order

Any 2nd-order ODE in which either the independent variable or the dependent variable is not explicitly present can be reduced to a 1st-order ODE as described in [gmd10] and thus solved more readily. One example of each kind are the following:

$$y'' + 2y' - 4x = 0, \quad y''y + y'^2 + 1 = 0.$$

Find the general solution of each ODE in explicit or implicit form. Each general solution must have two integration constants irrespective of the reduction. Check the results against the solution returned by the DSolve command of Mathematica.

Solution: