

9. 
$$F(x, xy'_x - my, y_x^{(m+1)}, y_x^{(m+2)}, \ldots, y_x^{(n)}) = 0, \quad m = 1, 2, \ldots, n-1.$$

The substitution  $w = xy'_x - my$  leads to an (n-1)st-order equation:

$$F(x, w, \zeta, \zeta'_x, \dots, \zeta^{(n-m-1)}_x) = 0$$
, where  $\zeta = w_x^{(m)}/x$ .

## Reference

**Polyanin, A. D. and Zaitsev, V. F.,** *Handbook of Exact Solutions for Ordinary Differential Equations, 2nd Edition,* Chapman & Hall/CRC, Boca Raton, 2003.

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