Math 4381/Math 6378 -Symmetry - Home Work 3

Invariance

Find infinitesimal transformations leaving the following ODEs invariant. Use these to find a change of variables that reduce the given ODE to one that is separable and solve.

$$1. \quad \frac{dy}{dx} = \frac{y}{x} + \frac{x^2}{x+y}$$

$$2. \quad \frac{dy}{dx} = \frac{3y}{x} + \frac{x^5}{2y+x^3},$$

Hints: Try

1. $X = A(x), \quad Y = B(x)y$
2. $X = A(x), \quad Y = B(y)$

Due: Feb. 22, 2021