

Problem 11

Determine whether each of the equations in Problems 1 through 12 is exact. If it is exact, find the solution.

$$(x \ln y + xy) + (y \ln x + xy)y' = 0; \quad x > 0, \quad y > 0$$

Solution

The ODE is not exact because

$$\frac{\partial}{\partial y}(x \ln y + xy) = \frac{x}{y} + x \neq \frac{\partial}{\partial x}(y \ln x + xy) = \frac{y}{x} + y.$$