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My Inspiration
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and
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Tutorial No. 3 : Condition of Compatibility of First Order Partial Differential Equations and Some Problem

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Problem 1:

Show that the condition for $f(x, y, z, p, q) = 0$ and $g(x, y, z, p, q) = 0$ compatible is $[f, g] = 0$

i.e. $$\frac{\partial(f, g)}{\partial(x, p)} + \frac{\partial(f, g)}{\partial(y, q)} + p\frac{\partial(f, g)}{\partial(z, p)} + q\frac{\partial(f, g)}{\partial(z, q)} = 0$$

Problem 2:

Show that the PDE $xp = yq$ and $z(xp + yq) = 2xy$ are compatible. Find Solution.

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Problem 3:

Show that the PDE $x\,p - y\,q = x$ and $x^2\,p + q = xz$ are compatible. Hence find Solution