

Q 1992 Find surface $4yzp + q + 2y = 0$ through $y^2 + z^2 = 1, x + z = 2$

$$\frac{dx}{4yz} = \frac{dy}{1} = \frac{dz}{-2y} \Rightarrow -2y dy = dz$$

$$-\frac{y^2}{2} = z + C_1 \Rightarrow \boxed{y^2 + 2z = C_1}$$

$$-2x = 2z^2 + C_2 \longrightarrow \boxed{x + z^2 = C_2}$$

$y^2 + z^2 = 1$ $x + z = 2 \Rightarrow z = t, x = 2 - t$

$\hookrightarrow y^2 = 1 - t^2 \Rightarrow y = \sqrt{1 - t^2}$

$C_1 + C_2 = 3 \Rightarrow \boxed{y^2 + z^2 + x + z = 3}$

Q 2008 $(2xy - 1)p + (z - 2x^2)q = 2(x - yz)$ via $(x=1, y=0)$

$$\frac{dx}{2xy - 1} = \frac{dy}{z - 2x^2} = \frac{dz}{2(x - yz)}$$

$2xy - x \quad yz - 2x^2y \quad x - yz \quad = x, y, \frac{1}{2} \Rightarrow x^2 + y^2 + 2z = C_1$

$z, 1, x \Rightarrow 2xyz - z + z - 2x^2 + 2x^2 - 2xyz = xz + y = C_2$

$z \neq 1 = C_1 \quad z = C_2 \Rightarrow C_1 - 1 = C_2$

$\boxed{x^2 + y^2 + z - 1 = xz + y}$