Stabilire se il seguente campo vettoriale, definito in tutto lo spazio R^3, e' conservativo:

1. $(X,Y,Z) = \left(e^{2+x\,y}\,y\,z^2, e^{2+x\,y}\,x\,z^2, 2\,e^{2+x\,y}\,x\,y\right)$
Risposta : *NO* $\quad X_y = e^{2+x\,y}\,z^2 + e^{2+x\,y}\,x\,y\,z^2 \qquad Y_x = e^{2+x\,y}\,z^2 + e^{2+x\,y}\,x\,y\,z^2$
$X_z = 2\,e^{2+x\,y}\,y\,z \qquad Z_x = 2\,e^{2+x\,y}\,y + 2\,e^{2+x\,y}\,x\,y^2$
$Y_z = 2\,e^{2+x\,y}\,x\,z \qquad Z_y = 2\,e^{2+x\,y}\,x + 2\,e^{2+x\,y}\,x^2\,y$

2. $(X,Y,Z) = \left(2\,x\,\cos(z), \dfrac{-2\,y\,z}{1+y^4\,z^2}, -\dfrac{y^2}{1+y^4\,z^2} - x^2\,\mathrm{sen}(z)\right)$
Risposta : *SI* $\quad X_y = Y_x = 0 \qquad X_z = Z_x = -2\,x\,\mathrm{sen}(z) \qquad Y_z = Z_y = \frac{4\,y^5\,z^2}{(1+y^4\,z^2)^2} - \frac{2\,y}{1+y^4\,z^2}$

3. $(X,Y,Z) = \left(1, -\dfrac{y\,z}{1+y^2\,z^2} - \mathrm{arctg}(y\,z), -\dfrac{y^2}{1+y^2\,z^2}\right)$
Risposta : *SI* $\quad X_y = Y_x = 0 \qquad X_z = Z_x = 0 \qquad Y_z = Z_y = \frac{2\,y^3\,z^2}{(1+y^2\,z^2)^2} - \frac{2\,y}{1+y^2\,z^2}$

4. $(X,Y,Z) = \left(e^{x\,y+z}\,y, e^{x\,y+z}\,x, e^{x\,y+z}\,z\right)$
Risposta : *NO* $\quad X_y = e^{x\,y+z} + e^{x\,y+z}\,x\,y \qquad Y_x = e^{x\,y+z} + e^{x\,y+z}\,x\,y$
$X_z = e^{x\,y+z}\,y \qquad Z_x = e^{x\,y+z}\,y\,z$
$Y_z = e^{x\,y+z}\,x \qquad Z_y = e^{x\,y+z}\,x\,z$

5. $(X,Y,Z) = \left(\mathrm{arctg}(z), -2\,y\,z\,\cos(y^2\,z), y^2\,\cos(y^2\,z)\right)$
Risposta : *NO* $\quad X_y = 0 \qquad Y_x = 0$
$X_z = \dfrac{1}{1+z^2} \qquad Z_x = 0$
$Y_z = -2\,y\,\cos(y^2\,z) + 2\,y^3\,z\,\mathrm{sen}(y^2\,z) \qquad Z_y = 2\,y\,\cos(y^2\,z) - 2\,y^3\,z\,\mathrm{sen}(y^2\,z)$

6. $(X,Y,Z) = \left(-(y\,\cos(x\,y)) + \log(2+z^2), -(x\,\cos(x\,y)), \dfrac{2\,x\,z}{2+z^2}\right)$
Risposta : *SI* $\quad X_y = Y_x = -\cos(x\,y) + x\,y\,\mathrm{sen}(x\,y) \qquad X_z = Z_x = \frac{2\,z}{2+z^2} \qquad Y_z = Z_y = 0$

7. $(X,Y,Z) = \left(z + y\,\mathrm{sen}(x\,y), x\,\mathrm{sen}(x\,y), x - \dfrac{2\,z}{2+z^2}\right)$
Risposta : *SI* $\quad X_y = Y_x = x\,y\,\cos(x\,y) + \mathrm{sen}(x\,y) \qquad X_z = Z_x = 1 \qquad Y_z = Z_y = 0$

8. $(X,Y,Z) = \left(1, -\mathrm{arctg}(y\,z), 1 + y^2\,z^2\right)$
Risposta : *NO* $\quad X_y = 0 \qquad Y_x = 0$
$X_z = 0 \qquad Z_x = 0$
$Y_z = -\dfrac{y}{1+y^2\,z^2} \qquad Z_y = 2\,y\,z^2$