Equations du mouvement :

$$\frac{Du}{Dt} = -\frac{1}{\rho}\frac{\partial p}{\partial x} + fv$$

$$\frac{Dv}{Dt} = -\frac{1}{\rho}\frac{\partial p}{\partial y} - fu$$

$$\frac{Dw}{Dt} = -g - \frac{1}{\rho}\frac{\partial p}{\partial z}$$

avec

$$\frac{D}{Dt} = \frac{\partial}{\partial t} + u\,\frac{\partial}{\partial x} + v\,\frac{\partial}{\partial y} + w\,\frac{\partial}{\partial z}$$

Composantes du vecteur tourbillon relatif :

$$\eta = \frac{\partial w}{\partial y} - \frac{\partial v}{\partial z}$$

$$\gamma = \frac{\partial u}{\partial z} - \frac{\partial w}{\partial x}$$

$$\xi = \frac{\partial v}{\partial x} - \frac{\partial u}{\partial y}$$

Equations pour les composantes du vecteur tourbillon :

$$\frac{D\eta}{Dt} = -\left[\eta\left(\frac{\partial v}{\partial y} + \frac{\partial w}{\partial z}\right)\right] + \left[\frac{\partial(1/\rho)}{\partial y}\frac{\partial p}{\partial z} - \frac{\partial(1/\rho)}{\partial z}\frac{\partial p}{\partial y}\right] - \left[(\xi + f)\frac{\partial u}{\partial z} - \gamma\frac{\partial u}{\partial y}\right]$$

$$\frac{D\gamma}{Dt} = -\left[\gamma\left(\frac{\partial u}{\partial x} + \frac{\partial w}{\partial z}\right)\right] + \left[\frac{\partial(1/\rho)}{\partial x}\frac{\partial p}{\partial z} - \frac{\partial(1/\rho)}{\partial z}\frac{\partial p}{\partial x}\right] - \left[(\xi + f)\frac{\partial v}{\partial z} - \eta\frac{\partial v}{\partial y}\right]$$

$$\frac{D(\xi + f)}{Dt} = -\left[(\xi + f)\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right)\right] + \left[\frac{\partial(1/\rho)}{\partial y}\frac{\partial p}{\partial x} - \frac{\partial(1/\rho)}{\partial x}\frac{\partial p}{\partial y}\right] - \left[\frac{\partial w}{\partial x}\frac{\partial v}{\partial z} - \frac{\partial w}{\partial y}\frac{\partial u}{\partial z}\right]$$