$$
\begin{aligned}
\frac{\partial u}{\partial t} + u\frac{\partial u}{\partial x} + w\frac{\partial u}{\partial z} &= -c_p\theta_0\frac{\partial \pi}{\partial x} + \frac{\partial}{\partial x}\left(K\frac{\partial u}{\partial x}\right) + \frac{1}{\rho_0}\frac{\partial}{\partial z}\left(\rho_0 K\frac{\partial u}{\partial z}\right), \\
\frac{\partial w}{\partial t} + u\frac{\partial w}{\partial x} + w\frac{\partial w}{\partial z} &= -c_p\theta_0\frac{\partial \pi}{\partial z} + g\frac{\theta}{\theta_0} \\
&\quad + \frac{\partial}{\partial x}\left(K\frac{\partial w}{\partial x}\right) + \frac{1}{\rho_0}\frac{\partial}{\partial z}\left(\rho_0 K\frac{\partial w}{\partial z}\right),
\end{aligned}
$$