$$
\begin{aligned}
&\frac{\partial \rho}{\partial t} + \vec{v}\nabla\rho = 0\,, \\
&\frac{\partial \vec{v}}{\partial t} + (\vec{v}\vec{\nabla})\vec{v} = -\frac{1}{\rho}\nabla P\,,
\end{aligned}
\tag{1}
$$

and

$$
\begin{aligned}
&v \propto r^2\,, \quad \text{for } r < R_0\,, \\
&v = 0\,, \quad\;\; \text{for } r > R_0\,.
\end{aligned}
\tag{2}
$$