Taking the partial derivaties of (20) and (21) with respect to z and r, respectively, and combining the resulting equations to eliminate σ_r , gives

$$\frac{\partial^2}{\partial r^2}\left(\frac{\bar{\sigma}}{\bar{\epsilon}}\gamma_{rz}\right) - \frac{2}{r}\frac{\partial}{\partial z}\left[\frac{\bar{\sigma}}{\bar{\epsilon}}(\epsilon_r - \epsilon_\theta)\right]$$

$$- \frac{\partial^2}{\partial z^2}\left(\frac{\bar{\sigma}}{\bar{\epsilon}}\gamma_{rz}\right) - 2\frac{\partial^2}{\partial r\,\partial z}\left[\frac{\bar{\sigma}}{\bar{\epsilon}}(2\epsilon_r + \epsilon_\theta)\right] \qquad (22)$$

$$+ \frac{1}{r}\frac{\partial}{\partial r}\left(\frac{\bar{\sigma}}{\bar{\epsilon}}\gamma_{rz}\right) - \frac{1}{r^2}\left(\frac{\bar{\sigma}}{\bar{\epsilon}}\gamma_{rz}\right) = 0$$

Using strain-displacement, and displacement-displacement function relations, equations (2) and (3), a single equation containing only the displacements function ψ , and the material strain parameters, $\bar{\sigma}$ and $\bar{\epsilon}$, can be written in the form

$$\frac{\bar{\sigma}}{\bar{\epsilon}}\nabla_1^4\psi + \nabla_3^2\psi\,\nabla_2^2\left(\frac{\bar{\sigma}}{\bar{\epsilon}}\right)$$