

### Stability Coefficients:

- Mellor and Yamada (1982)
- Galperin et al. (1988)
- Allen et al. (1995)

- The stability function for tracers is given by

$$S_H \left[ 1 - (3A_2 B_2 + 18A_1 A_2) G_H \right] = A_2 \left( 1 - \frac{GA_1}{B_1} \right) \tag{1}$$

and for momentum

$$S_M (1 - 9A_1 A_2 G_H) - S_H \left[ G_H (18A_1^2 + 9A_1 A_2) \right] = A_1 \left( 1 - 3C_1 - \frac{GA_1}{B_1} \right) \tag{2}$$

where

$$G_H = \min(0.028, G'_H)$$

$$G'_H = \frac{l^2 g}{g^2 \rho} \frac{\partial \rho}{\partial z} = - \frac{l^2}{g^2} N^2 \qquad N^2 = - \frac{g}{\rho} \frac{\partial \rho}{\partial z}$$

- Numerically (1) can be computed as

$$S_H = \frac{A_2 \left( 1 - \frac{GA_1}{B_1} \right)}{1 - (3A_2 B_2 + 18A_1 A_2) G_H}$$

or

$$\boxed{S_H = \frac{S_{H1}}{1 - S_{H2} G_H}} \tag{3}$$

where

$$\boxed{S_{H1} = A_2 \left( 1 - \frac{GA_1}{B_1} \right)} \tag{4}$$

$$\boxed{S_{H2} = 3A_2 B_2 + 18A_1 A_2} \tag{5}$$