3.6 Potential density anomaly

Potential density anomaly, σ^θ or σ^Θ, is simply potential density minus 1000 kg m^{-3},

$$\begin{aligned}\sigma^\theta\left(S_{\mathrm{A}},t,p,p_{\mathrm{r}}\right) = \sigma^\Theta\left(S_{\mathrm{A}},t,p,p_{\mathrm{r}}\right) &= \rho^\theta\left(S_{\mathrm{A}},t,p,p_{\mathrm{r}}\right) - 1000\ \mathrm{kg\ m^{-3}} \\ &= \rho^\Theta\left(S_{\mathrm{A}},t,p,p_{\mathrm{r}}\right) - 1000\ \mathrm{kg\ m^{-3}} \\ &= g_P^{-1}\left(S_{\mathrm{A}},\theta\left[S_{\mathrm{A}},t,p,p_{\mathrm{r}}\right],p_{\mathrm{r}}\right) - 1000\ \mathrm{kg\ m^{-3}}.\end{aligned} \tag{3.6.1}$$

Note that it is equally correct to label potential density anomaly as σ^θ or σ^Θ because both θ and Θ are constant during the isentropic and isohaline pressure change from p to p_{r}.