Page 113, equation (3.167)

Combining (3.164) and (3.165) gives:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}\lambda}\hat{\sigma} &= \frac{\mathrm{d}}{\mathrm{d}\lambda}\left[T^{-1}\mathrm{tr}\left(\left(\mathbf{T}^o + \rho^2\frac{\partial\hat{f}}{\partial\rho}\mathbf{1}\right)\lambda\mathbf{D}\right) + T^{-1}\mathrm{tr}(\mathbf{T}_N\lambda\mathbf{D}) - T^{-2}\mathbf{q}.\lambda\mathbf{g}\right]\\ &= \frac{\mathrm{d}}{\mathrm{d}\lambda}\left[\lambda T^{-1}\mathrm{tr}\left(\left(\mathbf{T}^o + \rho^2\frac{\partial\hat{f}}{\partial\rho}\mathbf{1}\right)\mathbf{D}\right) + \lambda T^{-1}\mathrm{tr}(\mathbf{T}_N\mathbf{D}) - \lambda T^{-2}\mathbf{q}.\mathbf{g}\right].\end{aligned}$$

Then the derivative in the condition (3.165) is:

$$\frac{\mathrm{d}}{\mathrm{d}\lambda}\hat{\sigma}\,|_{\lambda=0} = T^{-1}\mathrm{tr}\left(\mathbf{T}^o + \rho^2\frac{\partial\hat{f}}{\partial\rho}\mathbf{1}\right) + T^{-1}\mathrm{tr}(\mathbf{T}_N^o\mathbf{D}) - T^{-2}\mathbf{q}^o.\mathbf{g},$$

using (3.163):

$$\frac{\mathrm{d}}{\mathrm{d}\lambda}\hat{\sigma}\,|_{\lambda=0} = T^{-1}\mathrm{tr}\left(\mathbf{T}^o + \rho^2\frac{\partial\hat{f}}{\partial\rho}\mathbf{1}\right) - T^{-2}\mathbf{q}^o.\mathbf{g}$$

and (3.167) follows.