3.2 Quantitative approach for changes of p

Using Eq. (3.9) and taking into account that in the left hand side of Eq. (3.8) $\Delta_r G^0$ is independent of p (since G^0 is the standard potential at 1 bar), i.e. K_p is independent of pressure, we find

$$\left(\frac{\partial \ln(K_p)}{\partial p}\right)_T = 0 = \left(\frac{\partial \ln(K_x)}{\partial p}\right)_T + \frac{\partial}{\partial p}\left(\sum_i \ln\left(\frac{p_{tot}}{p^0}\right)^{\nu_i}\right) \Rightarrow \left(\frac{\partial \ln(K_x)}{\partial p}\right)_T = -\frac{\sum_i \nu_i}{p_{tot}} \quad . \tag{3.10}$$

So if $\sum_i \nu_i = 0$ holds K_x is independent of p, but if e.g. $\sum_i \nu_i > 0$ and $\Delta p > 0$ than K_x becomes smaller, i.e. we have less reaction products.