The Thermodynamics of Linear Fluids and Fluid Mixtures by Pekař \& Samohýl
Page 214, equation (4.333)
Writing (4.209) in space gradients gives:

$$
\begin{equation*}
\sum_{\beta=1}^{n-1} \sum_{\gamma=1}^{n} \omega_{\beta \gamma} \operatorname{grad} \rho_{\gamma}=-\operatorname{grad} P_{n}+\rho_{n} \operatorname{grad} g_{n}-\rho_{n} \frac{\partial \hat{f}_{n}}{\partial T} \operatorname{grad} T \tag{1}
\end{equation*}
$$

and similarly for (4.208):

$$
\begin{equation*}
\sum_{\gamma=1}^{n} \omega_{\beta \gamma} \operatorname{grad} \rho_{\gamma}=-\operatorname{grad} P_{\beta}+\rho_{\beta} \operatorname{grad} g_{\beta}-\rho_{\beta} \frac{\partial \hat{f}_{\beta}}{\partial T} \operatorname{grad} T . \tag{2}
\end{equation*}
$$

Henceforth, equilibrium is supposed and its symbol ${ }^{\circ}$ omitted.
Insertion of (4.320), (4.327) and (4.317) into (1) gives (remember that $\operatorname{grad} \rho \equiv \mathbf{h}$ and $\operatorname{grad} T \equiv \mathbf{g})$ :

$$
\sum_{\beta=1}^{n-1} \mathbf{k}_{\beta}=-\rho_{n}\left(\mathbf{b}_{n}+\mathbf{i}_{n}\right)-\mathbf{k}_{n}+\rho_{n} \operatorname{grad} g_{n}
$$

and with respect to (4.328):

$$
\begin{equation*}
\rho_{n}\left(\mathbf{b}_{n}+\mathbf{i}_{n}\right)=\rho_{n} \operatorname{grad} g_{n} . \tag{3}
\end{equation*}
$$

Similar substitution into (2) results in

$$
\mathbf{k}_{\beta}=\rho_{\beta}\left(\mathbf{b}_{\beta}+\mathbf{i}_{\beta}\right)+\mathbf{k}_{\beta}-\rho_{\beta} \operatorname{grad} g_{\beta}, \beta=1, \ldots, n-1
$$

and

$$
\begin{equation*}
\operatorname{grad} g_{\beta}=\left(\mathbf{b}_{\beta}+\mathbf{i}_{\beta}\right), \beta=1, \ldots, n-1 \tag{4}
\end{equation*}
$$

Equations (3) and (4) together (and not omitting the symbol ${ }^{o}$ ) form (4.333).

