The Thermodynamics of Linear Fluids and Fluid Mixtures by Pekař \& Samohýl

## Page 170, the first line (equation)

Obviously, from $\frac{\backslash \alpha}{\rho_{\alpha} \varepsilon_{\alpha}}=\grave{\rho}_{\alpha} \varepsilon_{\alpha}+\rho_{\alpha} \grave{\varepsilon}_{\alpha}$ we obtain:

$$
\begin{equation*}
\sum_{\alpha=1}^{n} \rho_{\alpha} \grave{\varepsilon}_{\alpha}=\sum_{\alpha=1}^{n} \frac{\backslash \alpha}{\rho_{\alpha} \varepsilon_{\alpha}}-\sum_{\alpha=1}^{n} \grave{\rho}_{\alpha} \varepsilon_{\alpha} . \tag{1}
\end{equation*}
$$

The first term on r.h.s. can be expressed using (4.3):

$$
\begin{aligned}
\sum_{\alpha} \frac{\backslash \alpha}{\rho_{\alpha} \varepsilon_{\alpha}} & =\sum_{\alpha}\left[\frac{\partial}{\partial t}\left(\rho_{\alpha} \varepsilon_{\alpha}\right)+\mathbf{v}_{\alpha} \cdot \operatorname{grad}\left(\rho_{\alpha} \varepsilon_{\alpha}\right)\right] \\
& =\frac{\partial}{\partial t} \sum_{\alpha}\left(\rho_{\alpha} \varepsilon_{\alpha}\right)+\sum_{\alpha} \mathbf{v}_{\alpha} \cdot \operatorname{grad}\left(\rho_{\alpha} \varepsilon_{\alpha}\right)
\end{aligned}
$$

and referring to (4.104):

$$
\begin{equation*}
\sum_{\alpha} \frac{\backslash \alpha}{\rho_{\alpha} \varepsilon_{\alpha}}=\sum_{\alpha} \mathbf{v}_{\alpha} \cdot \operatorname{grad}\left(\rho_{\alpha} \varepsilon_{\alpha}\right) \tag{2}
\end{equation*}
$$

Combining (1) and (2) gives the equation in the first line on page 170.

