$$\Lambda_0(\theta) = \frac{\theta^{0.5}}{\sum_{i=1}^{5} n_i \theta^{1-i}}, \tag{3.5}$$

where $\theta = T/T_c$ with $T_c = 647.096$ K; the coefficients n_i are listed in Table 3.4. The correlation equation for the second function of Eq. (3.4), $\Lambda_1(\delta, \theta)$, reads

$$\Lambda_1(\delta,\theta) = \exp\left[\delta \sum_{i=1}^{5}\left(\left(\frac{1}{\theta}-1\right)^{i-1} \sum_{j=1}^{6} n_{ij}(\delta-1)^{j-1}\right)\right], \tag{3.6}$$

where $\delta = \rho/\rho_c$ and $\theta = T/T_c$ with $\rho_c = 322$ kg m^{-3} and $T_c = 647.096$ K. The coefficients n_{ij} are given in Table 3.5. The function $\Lambda_2(\delta,\theta)$ represents the critical enhancement of the thermal conductivity. This additive contribution is defined for IAPWS-IF97 regions 1-2 and 3 by

$$\Lambda_2(\delta,\theta) = n_1 \frac{\delta\theta}{\Psi} \frac{c_p}{R} A, \tag{3.7}$$

where $\delta = \rho/\rho_c$ and $\theta = T/T_c$ with $\rho_c = 322$ kg m^{-3} and $T_c = 647.096$ K. The numerical constant n_1 is given in Table 3.6. The variable $\Psi = \eta/\eta^*$ with $\eta^* = 1 \times 10^{-6}$ Pa s represents the dimensionless dynamic viscosity calculated from Eq. (3.1); see Section 3.1. The calculation of the enclosed specific isobaric heat capacity c_p depends on the region where the given state point is located. Its calculation will be described later in this section. The variable R in Eq. (3.7) represents the specific gas constant of water and is given in [36] by $R = 0.461\,518\,05$ kJ kg^{-1} K^{-1}. This value for R is different from the value given in Sec. 1 but is consistent with Eq. (3.7). The function A[23] is defined by

$$A = \frac{n_2}{a}\left[\left(1-\frac{1}{b}\right)\arctan(a) + \frac{a}{b} - 1 + \exp\left(-\frac{1}{a^{-1} + \frac{1}{3}a^2\delta^{-2}}\right)\right], \tag{3.7a}$$

$$\text{with } a = n_3(\delta B)^{n_4}, \tag{3.7b}$$

$$B = p_c \delta \kappa_T - n_5 \theta^{-1} C, \tag{3.7.c}$$

$$C = \frac{1}{\sum_{i=1}^{6} n_i \delta^{i-1}}, \tag{3.7d}$$

$$\text{and } b = c_p/c_v, \tag{3.7e}$$

[23] The quantity A corresponds to the quantity $Z(y)$, Eq. (19), in the release [36]. The quantity $\Delta\bar{\chi}$ in Eq. (23) of [36] was replaced by the quantity B, Eq. (3.7c), which contains the isothermal compressibility κ_T. Thus, the calculation of the partial derivative $(\partial\bar{\rho}/\partial\bar{p})_{\bar{T}}$, Eq. (24) of [36], is avoided. The isothermal compressibility κ_T can be straightforward calculated from the IAPWS-IF97 basic equations as described below Eq. (3.7e).