Compute $x_0 = \theta_{1005}$ from equation (26).

↓

Compute the quantities

$$f(x_0) = b_0 + b_1 \ln(x_0 - b_2) + b_3 x_0 + b_4 x_0^2$$
$$f(T) = b_0 + b_1 \ln(T - b_2) + b_3 T + b_4 T^2$$
$$f'(x_0) = \frac{b_1}{x_0 - b_2} + b_3 + 2b_4 x_0$$

by using the previously obtained x_0 and the coefficients (C4).

↓

Compute the first iterate x_1 using (C5) with $k = 0$, i.e.

$$x_1 = x_0 - \frac{R_a \ln\left(\frac{p}{p_0}\right) - f(T) + f(x_0)}{f'(x_0)}.$$

↓

Compute

$$f(x_1) = b_0 + b_1 \ln(x_1 - b_2) + b_3 x_1 + b_4 x_1^2$$
$$f'(x_1) = \frac{b_1}{x_1 - b_2} + b_3 + 2b_4 x_1$$

by using the previously obtained x_1 and the coefficients (C4).

↓

Compute the second iterate x_2 using (C5), with $k = 1$ and the obtained x_1, i.e.

$$x_2 = x_1 - \frac{R_a \ln\left(\frac{p}{p_0}\right) - f(T) + f(x_1)}{f'(x_1)}.$$

↓

Set $\theta^{(2)} = x_2$ as the final approximation to the reference potential temperature θ_{ref} of the ideally behaving air.