How to calculate $\dot{q}_{cond}$?

$\begin{cases} P_m - \text{pressure at } z = H/ \\ T_t - \text{top temperature} \\ T_B - \text{bottom temp.} \\ \Delta \equiv T_B - T_t \end{cases}$

Known: P_m, T_t, T_B

Algorithm:

$n := 0$

Put $P_n(z) = P_m$, $T_n(z) = T_m$

Calculate: $\begin{cases} \rho_n(z) = \rho_n(z, T_n, P_n) & \text{– density} \\ \lambda_n(z) = \lambda_n(z, T_n, P_n) & \text{– thermal conductivity} \end{cases}$

Compute: $\boxed{P_{n+1}(z) = g \int_z^{H/2} \rho_n \, dz + P_m}$,

(as it is a solution of $\begin{cases} \partial_z P_{n+1} = -g\rho_n \\ P_{n+1}(H/2) = P_m \end{cases}$)

Compute: $\boxed{T_{n+1} = -\Delta \dfrac{\int_0^z \frac{dz}{\lambda_n}}{\int_0^H \frac{dz}{\lambda_n}} + T_B}$

(as it is a solution of $\begin{cases} \partial_z(\lambda_n \partial_z T_{n+1}) = 0 \\ T_{n+1}(0) = T_B \\ T_{n+1}(H) = T_t \end{cases}$)

Put $n := n+1$

Take $T(z)$ as the last $T_{n+1}(z)$
$P(z)$ as the last $P_{n+1}(z)$

Calculate $\lambda \doteq \lambda(T_{n+1}, P_{n+1})$

Compute:

$$\boxed{\dot{q}_{cond} = -\Delta \left(\int_0^H \frac{dz}{\lambda} \right)^{-1}}$$

(as it is a solution of $\dot{q}_{cond} = \lambda \partial_z T$
at any z, e.g. $z = 0$)