System of two pde (variables: T and ϑ) :

$$\begin{cases} \nabla.(k_s \vartheta^n \nabla T) = 0 \\ k_s \vartheta^n \nabla T.\nabla\vartheta - S_1 S_2 \nabla.\nabla\vartheta = 0 \end{cases} \quad (1)$$

Boundary conditions:

$$\begin{cases} \mathrm{T} = \mathrm{T_i} \\ \vartheta = 1 \end{cases} at\ \alpha_\mathrm{i}\ , \mathrm{i} = 1, 2, 3, \ldots \quad (2)$$

$$\begin{cases} \frac{\partial \mathrm{T}}{\partial \mathrm{n}} = 0 \\ \vartheta = 0 \end{cases} elsewhere \quad (3)$$

$\nabla \equiv \partial/\partial x\,(\vec{\imath}) + \partial/\partial y\,(\vec{\jmath}) + \partial/\partial z\,(k).$

Constant temperature: T_1, T_2, T_3

Constants: n, k_s ; S_1; S_2