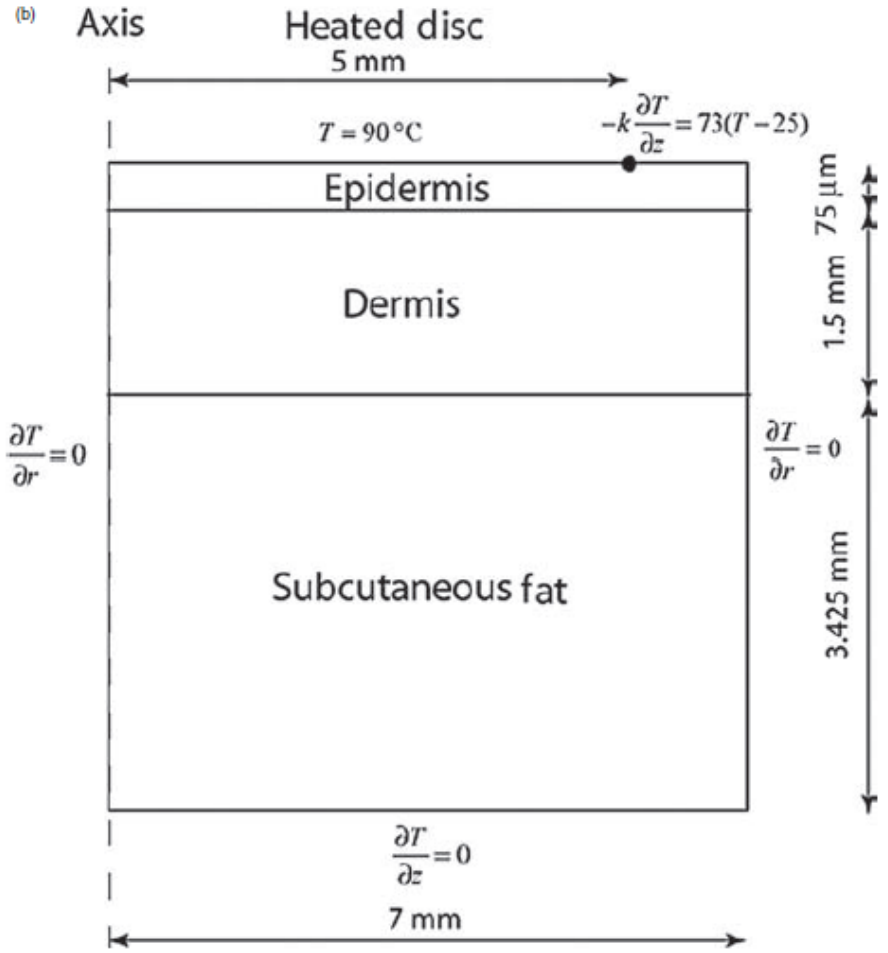
Geometry



Parameters

Name	Expression	Value	Description
rho_b	1100[kg/m^3]	1100 kg/m³	Blood density
C_pb	3300[J/(kg*K)]	3300 J/(kg·K)	Blood Specific Heat
V_b	4e-4[1/s]	4E-4 1/s	Blood flow rate per unit v...
T_a	310.15[K]	310.15 K	Arterial blood temperature
A	3e98[1/s]	3E98 1/s	Frequency factor
Ea	6.3e8[J/kmol]	6.3E5 J/mol	Activation Energy

Input parameters

Parameter	Value
Frequency factor, A	3×10^{98} l/s
Duration of heating, t	15 s
Convective heat transfer coefficient, h	73 $Wm^{-2}K^{-1}$
Thermal conductivity, k	
Epidermis	0.21 $Wm^{-1}K^{-1}$
Dermis	0.37 $Wm^{-1}K^{-1}$
Subcutaneous fat	0.16 $Wm^{-1}K^{-1}$
Density, ρ	
Blood, ρ_b	1100 kgm^{-3}
Epidermis	1000 kgm^{-3}
Dermis	1000 kgm^{-3}
Subcutaneous fat	1000 kgm^{-3}
Specific heat, C_p	
Blood, $C_{p,b}$	3300 $Jkg^{-1}K^{-1}$
Epidermis	3181.82 $Jkg^{-1}K^{-1}$
Dermis	2846.15 $Jkg^{-1}K^{-1}$
Subcutaneous fat	1975.31 $Jkg^{-1}K^{-1}$
Arterial blood temperature, T_a	37 °C
Initial tissue temperature, T_i	34 °C
Heating disc temperature, T_d	90 °C
Ambient air temperature, T_∞	25 °C
Dermal blood perfusion rate, $\dot{V}_b^v$	0.024 ml/min/ml tissue

Mesh setup

Boundary	1,9	2, 4, 6	3, 10	5, 11	7	8
Number of elements	10	210	20	10	150	60
Element ratio	2	1	20	1	1	1
Reverse direction	Check		Check			