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dr=0.0003;
r=[0.0832:dr:0.1696];
N=size(r,2);
T=zeros(1,N-2);

k_tricast=0.021;
k_abs=0.163;
k_air=0.025;
k_water=0.5861;

k_thermal=k_abs*ones(1,N);
k_thermal(1:7)=k_abs*ones(1,7);
k_thermal(8:11)=k_air*ones(1,4);
k_thermal(12:17)=k_abs*ones(1,6);
k_thermal(18:20)=k_air*ones(1,3);
k_thermal(21:33)=k_abs*ones(1,13);
k_thermal(34:68)=k_abs*ones(1,35);
k_thermal(69:102)=k_air*ones(1,34);
k_thermal(103:125)=k_water*ones(1,23);
k_thermal(126:147)=k_air*ones(1,22);
k_thermal(148:153)=k_abs*ones(1,6);
k_thermal(154:281)=k_tricast*ones(1,128);
k_thermal(282)=k_air*ones(1,1);
k_thermal(282:289)=k_abs*ones(1,8);

T0 = 0;
TN = 25.5; %input from the temp. sensor, needs to be
converted into degrees Celsius
dt=0.002;
A=zeros(N-2,N-2);
B=zeros(N-2,1);
k=1;

A(k,k+1) =
0.25*(k_thermal(k+1)+k_thermal(k+2))*(r(k+1)+r(k+2))/(r(k+
1)*dr^2);
A(k,k) = -A(k,k+1)-
0.25*(k_thermal(k+1)+k_thermal(k))*(r(k+1)+r(k))/(r(k+1)*d
r^2)
for k=2:N-3
    A(k,k-1)=0.25*(k_thermal(k+1)+k_thermal(k)
)*(r(k+1)+r(k))/(r(k+1)*dr^2);

A(k,k+1)=0.25*(k_thermal(k+1)+k_thermal(k+2))*(r(k+1)+r(k+
2))/(r(k+1)*dr^2);
    A(k,k) =-A(k,k-1)-A(k,k+1);
end

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k=N-2;
A(k,k-1) =
0.25*(k_thermal(k+1)+k_thermal(k))*(r(k+1)+r(k))/(r(k+1)*d
r^2);
A(k,k) = -A(k,k-1)-
0.25*(k_thermal(k+1)+k_thermal(k+2))*(r(k+1)+r(k+2))/(r(k+
1)*dr^2);
B(k) = -
0.25*(k_thermal(k+1)+k_thermal(k+2))*(r(k+1)+r(k+2))*TN/(r
(k+1)*dr^2)

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T=inv(A)*B;

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T1=[T0; T; TN];

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q=nan(1,N)
for k=1:N-1

q(k)=0.25*(r(k+1)+r(k))*(k_thermal(k+1)+k_thermal(k))*(T1(
k+1)-T1(k))/dr;
end
q(N)=q(N-1)

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qr = q(1)/0.0832 %output

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