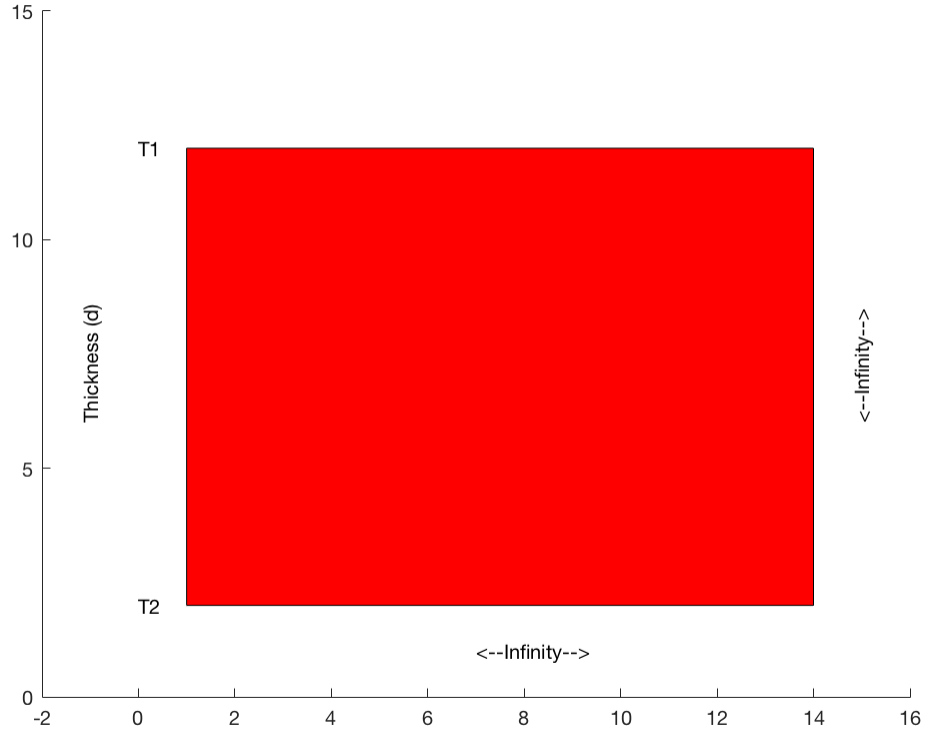
Table of Contents

HW #5 Seafloor Subsidence due to cooling (Nick G. & Josh E.)

```
clear all
clc
```

Part 1: A Model

```
r = rectangle('Position',[1 2 13 10],'FaceColor','r');
axis([-2 16 0 15]);
text(0,12,'T1');
text(0,2,'T2');
text(7,1,'<--Infinity-->');
text(15,6,'<--Infinity-->','rotation',90);
h = text(-1,6,'Thickness (d)','rotation',90);
```



Step 2: Heat Flow

Q = -k((T2-T1)/d) Why does heat flow down in this equation?

Step 3: Thermal Conductivities

Silver: Magnesium: Glass: Rock: Wood:

Step 4: The heat transport eqaution

Step 5: The conservation Equation

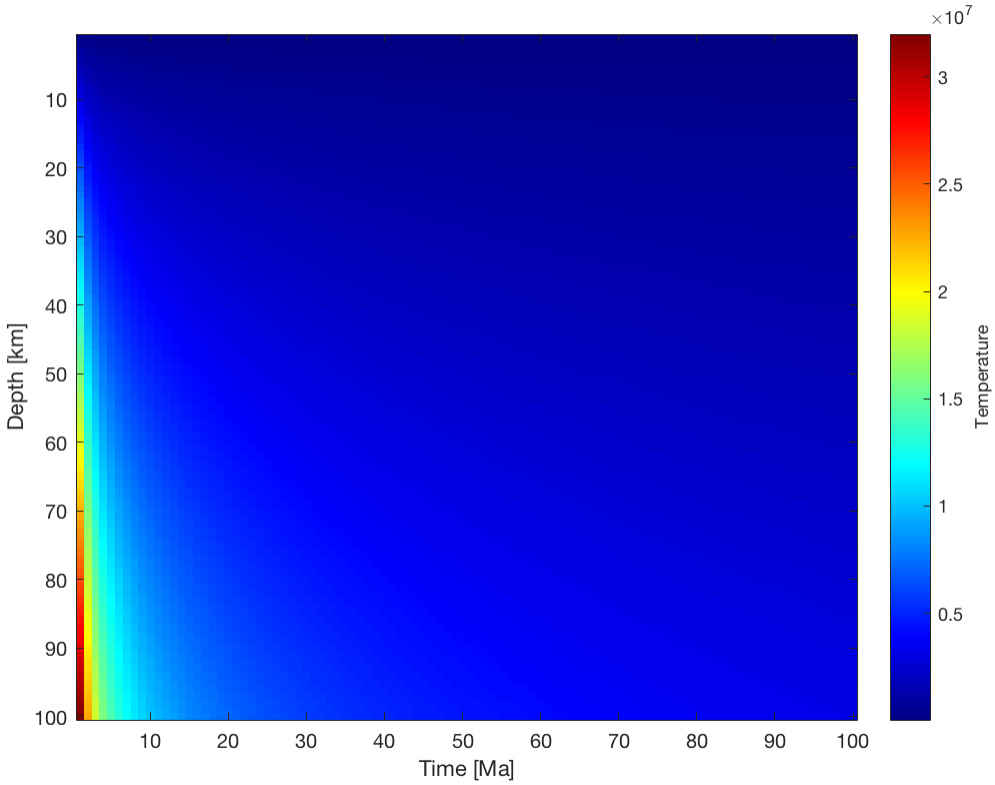
Part 2: Oceanic Lithospheric Cooling

Step 1: Setup the model domain and compute

T(z,t) = T0 * erf(z/(2*sqrt(K*t)))

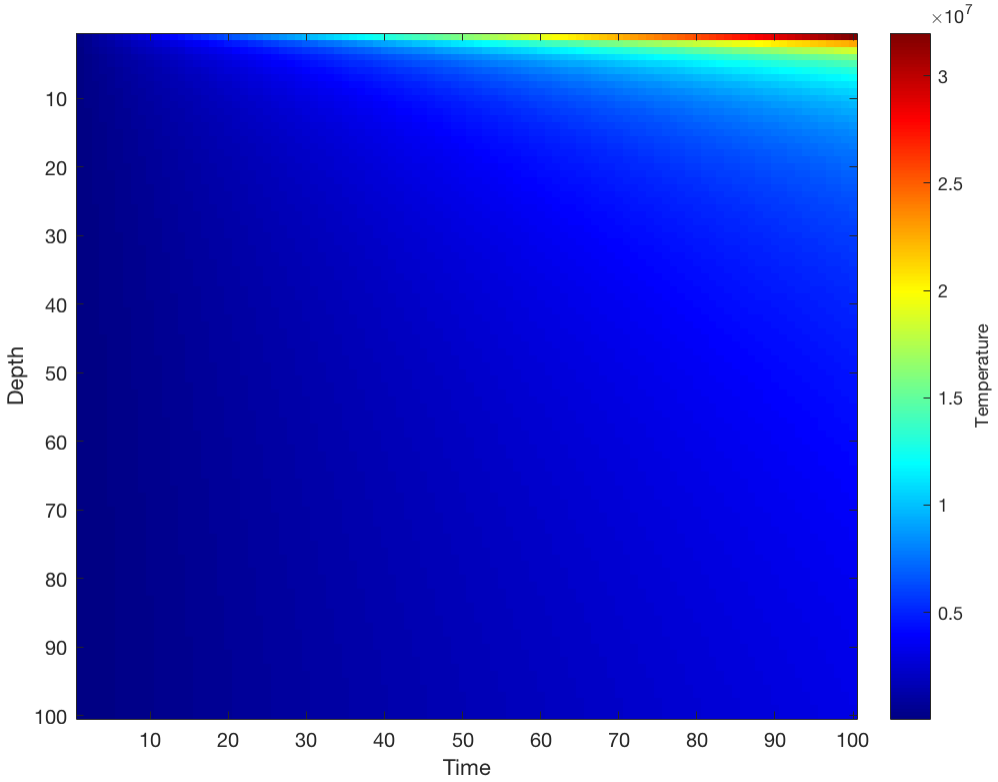
```
depthV = 1:100;
timeV = 1:100;
```

```
K = 1.0e-6;
T0 = 640;
% Now for two for loops
for ii = 1:100;

    for jj = 1:100;

     T(ii,jj) = T0 .* (ii./(2*sqrt(K*jj)));

    end

end

 imagesc(depthV,timeV,T);
 xlabel('Time [Ma]');
 ylabel('Depth [km]');
 c = colorbar;
 colormap( jet(200));
 ylabel(c,'Temperature');
 zlabel('Temperature');
 figure(1);
 J = erf(T);
```



Using the meshgrid() method

```
 x = 1:100;
 y = 1:100;
[x1,y1] = meshgrid(depthV,timeV);
Z = T0 .* (x1./(2*sqrt(K*y1)));
imagesc(depthV,timeV,Z);
V = erf(Z);
xlabel('Time');
ylabel('Depth');
c = colorbar;
colormap( jet(200));
ylabel(c,'Temperature');
```



Step 2: Analyze the model output

Published with MATLAB® R2016a