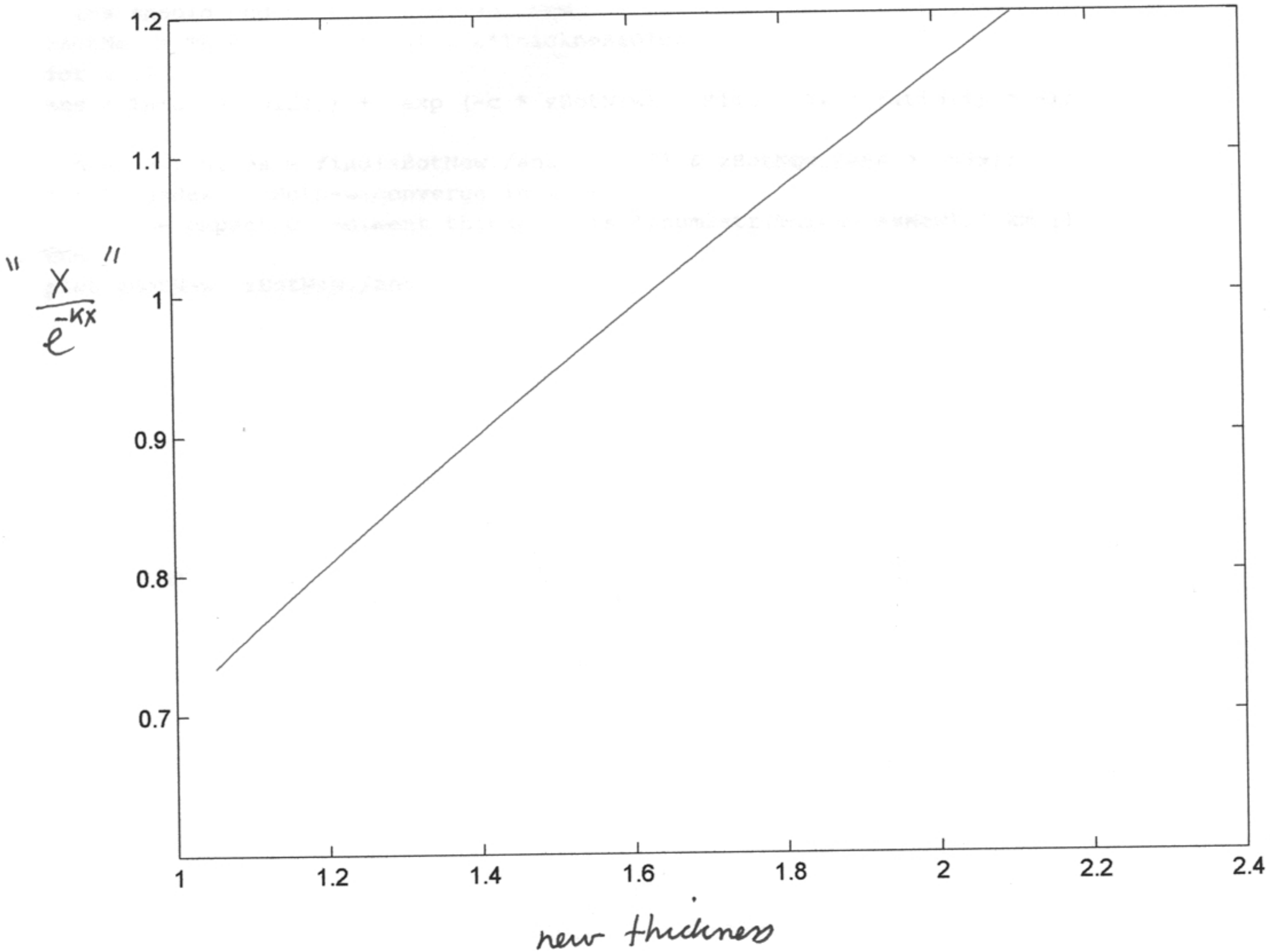
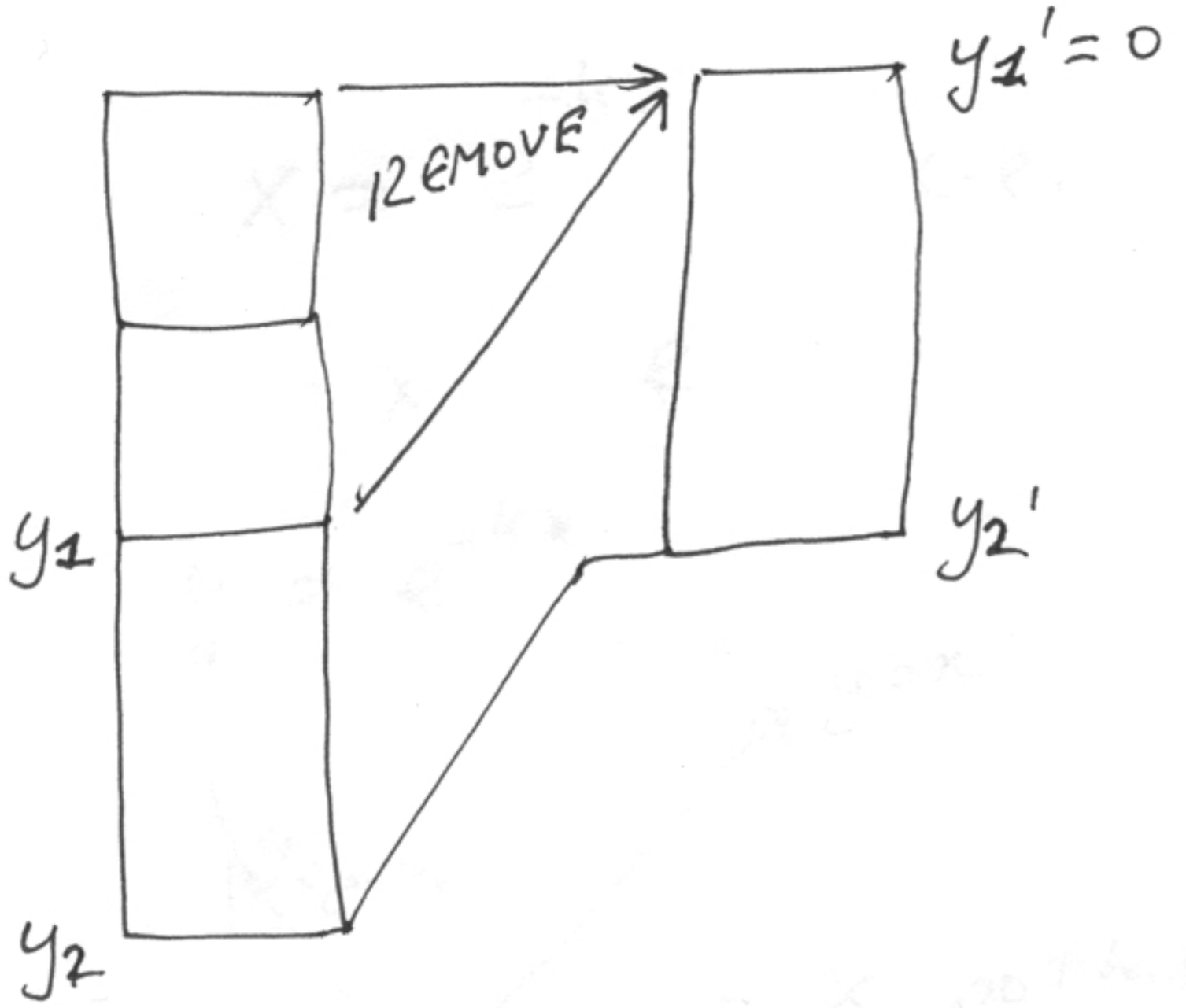
```
function decompatction

ZTopOld = [3.976 3.517] %km
ZBotOld = [5.028 ] %km
ThicknessOld = ZBotOld - ZTopOld;
zTopNew = 0; % km
zBotNew = ThicknessOld; % a minimum starting value
c = [0.39 ];
phi0 = [0.56 ];
ratio = phi0/c;
K1 = exp(-c * ZTopOld) - exp (-c * ZBotOld);
% Find zBotNew by iteration
% First try ZBotNew with the above minimum starting value
% ans should end up equalling zBotNew
zBotNew = ThicknessOld: .01 : 2*ThicknessOld;
for i =1:1
ans = ThicknessOld(i) + (exp (-c * zBotNew) + K1(i) -1) * ratio(i) * -1;

converge_indices = find(zBotNew./ans < 1.001 & zBotNew./ans > .999);
ThicknessNew = zBotNew(converge_indices)
disp(['Decompacted sediment thickness is ',num2str(ThicknessNew),' km'])
end
plot(zBotNew, zBotNew./ans)
```

layer 1, example in book.





From (8.23), & $y_2' = 0$

$$y_2' = (y_2 - y_1) - \frac{\phi_0}{c}\left\{ e^{-cy_1} - e^{-cy_2} - 1 + e^{-cy_2'} \right\}$$

Write code to determine y_2' so that above equation is solved.

i.e.

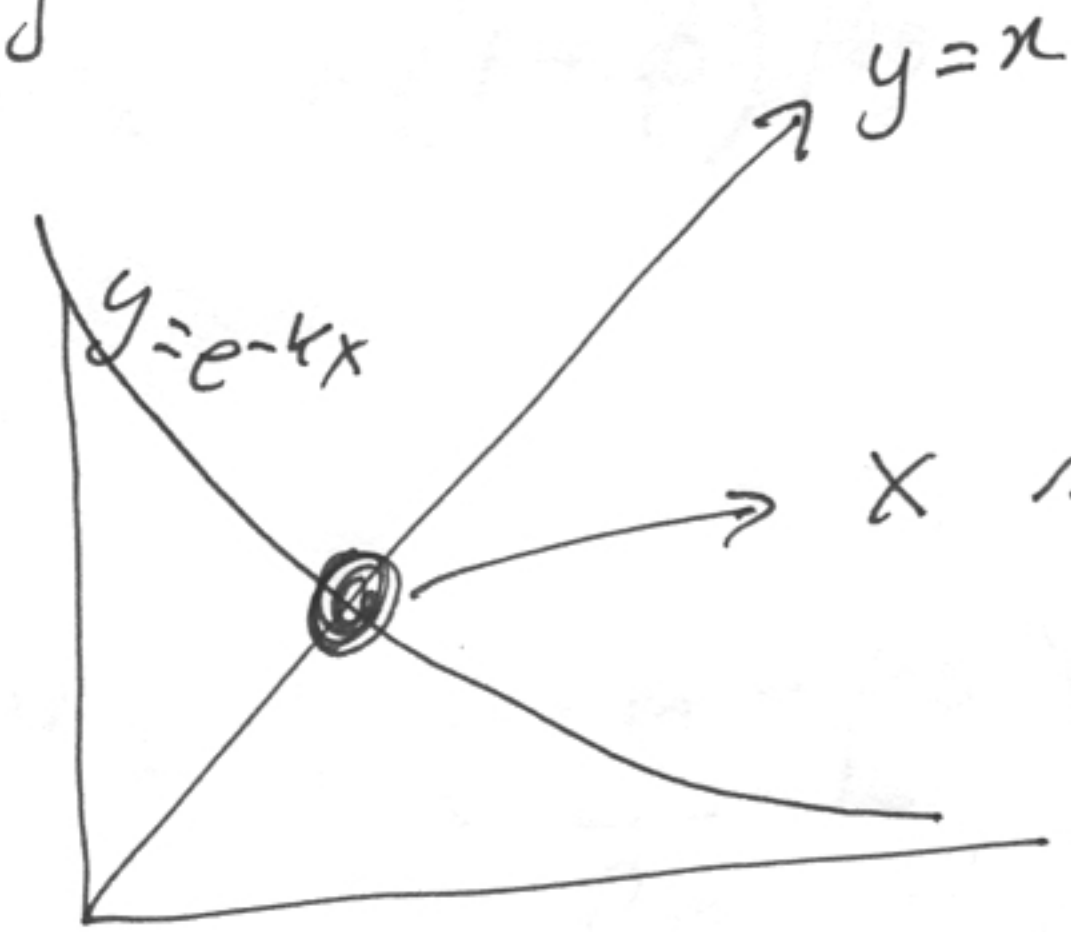
$$y \cong K_1$$

The above problem is reduced to

$$x = e^{-kx}$$ i.e.

$$y = x \quad R$$

$$y = e^{-kx}$$



so that both equations are equal.

OR

$$\frac{x}{e^{-kx}} = 1$$ i.e. find ratios until a result ~1 is reached by iteration.

$$\phi = \frac{\phi_0}{c}\left[\frac{e^{-y_1'} - e^{-cy_2'}}{y_2' - y_1'}\right] \qquad y_1' = 0$$

$$= \frac{\phi_0}{c}\left[\frac{1 - e^{-cy_2'}}{y_2' - 1}\right] \qquad \forall \text{ layers}$$

$$\rho_s = \phi \rho_w + (1-\phi)\rho_{sg}$$

2270 kg/m^3 shales
2650 kg/m^3 s stone
2710 " chalk
2680 " shaby sand

Then $Y = S\left(\frac{\rho_m - \rho_s}{\rho_m - \rho_w}\right)$

where S = uncompacted sediment thickness

For decompacting the second and third layer and so on....., use 8.23, with y_2' equal to the depth of the bottom of the overlying layer.

After decompaction, account for loading by (1) new weight of decompacted & recompacted sediments

(2) new water layer thickness which depends on the eustatic history.