# Assignment

Mechanism Laboratory (MES 453 ) Prof. Achintya Kumar Pramanick

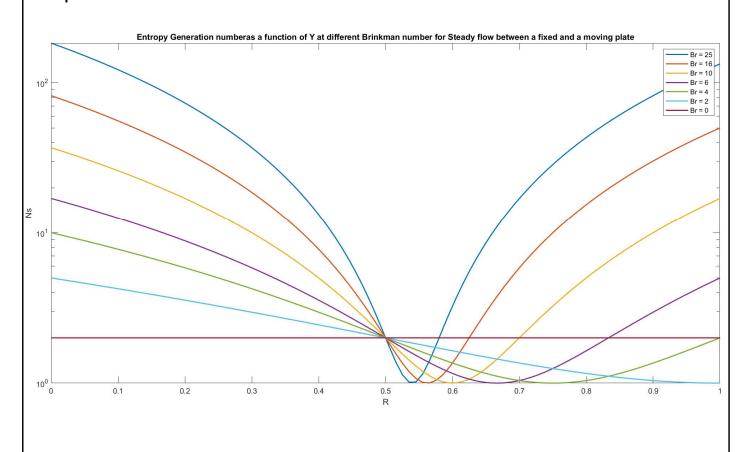
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```
Code:
R = linspace(0,1,100);
plot(R,(R.^3 - 2*R).^2 + 0*R.^2,LineWidth=1.5);
xlabel('R')
ylabel('Ns')
title(['Entropy generation number as a function of R for Convection in a Round
Tube'])
hold on
plot(R,(R.^3 - 2*R).^2 + 0.1*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.2*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.3*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.4*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.5*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.6*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 0.7*R.^2,LineWidth=1.5);
plot(R,(R.^3 - 2*R).^2 + 01*R.^2,LineWidth=1.5);
hold off
legend("Br/\Omega = 0", "Br/\Omega = 0.1", "Br/\Omega = 0.2", "Br/\Omega = 0.3", "Br/\Omega = 0.4", "Br/\Omega
0.5", "Br/\Omega = 0.6", "Br/\Omega = 0.7", "Br/\Omega = 1")
Graph:
                                                                                     Br/\Omega = 0.
                                                                                      Br/Q = 0.2
      1.8
                                                                                      Br/\Omega = 0.5
      1.2
     ° 1
      0.8
      0.6
      0.4
```

0.2

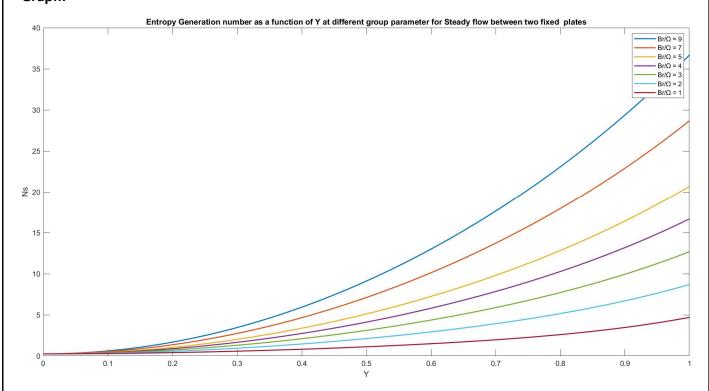
 $2)_{\text{cade}}$ 

```
Y = linspace(0,1,100);
semilogy(Y,(1+(25./2)-25*Y).^2 +1,LineWidth=1.5)
xlabel('R')
ylabel('Ns')
title('Entropy Generation numberas a function of Y at different Brinkman number
for Steady flow between a fixed and a moving plate')
hold on
plot(Y,(1+(16./2)-16*Y).^2 +1,LineWidth=1.5)
plot(Y,(1+(10./2)-10*Y).^2 +1,LineWidth=1.5)
plot(Y,(1+(6./2)-6*Y).^2 +1,LineWidth=1.5)
plot(Y,(1+(4./2)-4*Y).^2 +1,LineWidth=1.5)
plot(Y,(1+(2./2)-2*Y).^2 +1,LineWidth=1.5)
plot(Y,(1+(0./2)-0*Y).^2 +1,LineWidth=1.5)
hold off
legend("Br = 25", "Br = 16", "Br = 10", "Br = 6", "Br = 4", "Br = 2", "Br = 0")
```



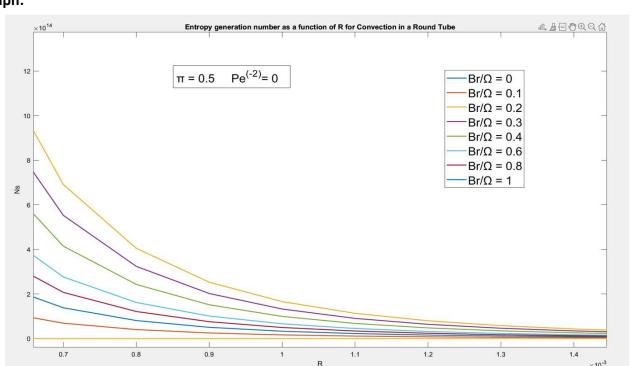
 $3)_{\text{cade}}$ 

```
Y = linspace(0,1,100);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*9,LineWidth=1.5);
xlabel('Y')
ylabel('Ns')
title('Entropy Generation number as a function of Y at different group parameter for Steady flow between two fixed plates')
hold on
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*7,LineWidth=1.5);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*5,LineWidth=1.5);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*4,LineWidth=1.5);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*3,LineWidth=1.5);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*2,LineWidth=1.5);
plot(Y,(0.5-1.3333*Y.^3).^2+4*Y.^2*1,LineWidth=1.5);
hold off
legend("Br/Ω = 9","Br/Ω = 7","Br/Ω = 5","Br/Ω = 4","Br/Ω = 3","Br/Ω = 2","Br/Ω = 1")
```



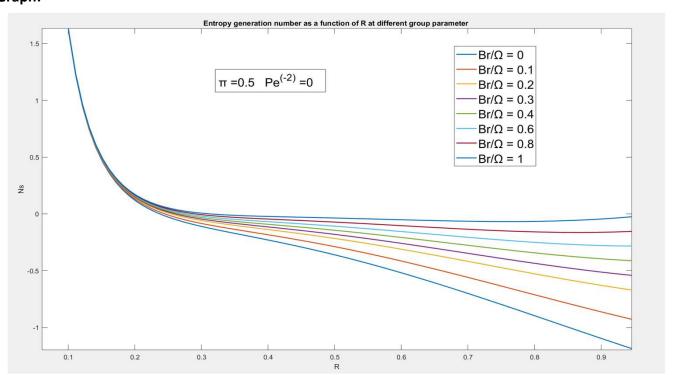
Code: c1 = 0.167978719;c2 = 1.08202128;R = linspace(0,1,10000); $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*1*((2*R-R.^3)/(c2-1))).^3 + 4*1*((2*R-R.^3)/(c2-1))).^4 + 4*1*((2*R-R.^3)/(c2-1))).^5 + 4*1*((2*R-R.^3)/(c2-1)))$  $(c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5) xlabel('R') ylabel('Ns') title(['Entropy generation number as a function of R for',' Convection in a Round Tube']) hold on  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.8*((2*R-R.^3)/(c2-1)))$  $(c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5)  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.6*((2*R-R.^3)/(c2-1))).^3 + 4*0.6*((2*R-R.^3)/(c2-1))).^4 + 4*0.6*((2*R-R.^3)/(c2-1))).^4 + 4*0.6*((2*R-R.^3)/(c2-1))).^4 + 4*0.6*((2*R-R.^3)/(c2-1))).^5 + 4*0.6*((2*R-R.^3)/(c2-$ (c2./(R.^2))).^2)./(c1^2),LineWidth=1.5)  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.4*((2*R-R.^3)/(c2-1))).^2 + 4*0.4*((2*R-R.^3)/(c2 (c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5)  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.3*((2*R-R.^3)/(c2-1))).^2 + 4*0.3*((2*R-R.^3)/(c2-1))).^3 + 4*0.3*((2*R-R.^3)/(c2-1))).^4 + 4*0.3*((2*R-R.^3)/(c2-1))).^4 + 4*0.3*((2*R-R.^3)/(c2-1))).^5 + 4*0.3*((2*R-R.^3)/(c2 (c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5)  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.2*((2*R-R.^3)/(c2-1))).^3 + 4*0.2*((2*R-R.^3)/(c2-1))).^4 + 4*0.2*((2*R-R.^3)/(c2-1))).^4 + 4*0.2*((2*R-R.^3)/(c2-1))).^5 + 4*0.2*((2*R-R.^3)/(c2 (c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5)  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0.1*((2*R-R.^3)/(c2-1)))$  $(c2./(R.^2))).^2)./(c1^2), LineWidth=1.5)$  $plot(R,(((2*R.*(1+(c2*log(R))-c2))/(c2-1) + (c2*R-R.^3)/(c2-1))).^2 + 4*0*((2*R-R.^3)/(c2-1))).^3 + 4*0*((2*R-R.^3)/(c2-1))).^4 + 4*0*((2*R-R.^3)/(c2-1))).^5 + 4*0*((2*R-R.^3)/(c2-1)))$  $(c2./(R.^2))).^2)./(c1^2)$ , LineWidth=1.5) hold off

legend("Br/ $\Omega$  = 0", "Br/ $\Omega$  = 0.1", "Br/ $\Omega$  = 0.2", "Br/ $\Omega$  = 0.3", "Br/ $\Omega$  = 0.4", "Br/ $\Omega$  = 0.6", "Br/ $\Omega$  = 0.8", "Br/ $\Omega$  = 1")



ode: R = linspace(0,1,100); $plot(R,(0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1)+ 0.5*1./((-1.05)-1)).^2./(0.25 - 2*log(0.5)+1)+ 0.5*1./((-1.05)-1)+ 0.$ 0.3465736./R.^2)),LineWidth=1.5) xlabel('R') ylabel('Ns') title('Entropy generation number as a function of R at different group parameter ') hold on  $plot(R,(0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.8./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./((-1.0.5)-1) + 0.5*0.2./((-1.$ 0.3465736./R.^2)),LineWidth=1.5)  $plot(R,(0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.6./((-1.0.5)).$ 0.3465736./R.^2)),LineWidth=1.5)  $plot(R, (0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.5./((-$ 0.3465736./R.^2)),LineWidth=1.5) plot(R,(0.25./R + R.\*(2\*log(R./0.5)-1)).^2./(0.25 - 2\*log(0.5)+1)+ 0.5\*0.4./((-0.3465736./R.^2)),LineWidth=1.5)  $plot(R, (0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.3./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./(0.25 - 2*log$ 0.3465736./R.^2)),LineWidth=1.5)  $plot(R,(0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1) + 0.5*0.2./((-1.0.5)-1) + 0.5*0.2./((-1.$ 0.3465736./R.^2)),LineWidth=1.5)  $plot(R,(0.25./R + R.*(2*log(R./0.5)-1)).^2./(0.25 - 2*log(0.5)+1)+ 0.5*0.1./((-1.0.5)-1)).^2./(0.25 - 2*log(0.5)+1)+ 0.5*0.1./((-1.0.5)-1)+ 0.5*0.1./((-1.$ 0.3465736./R.^2)),LineWidth=1.5) hold off

legend("Br/ $\Omega$  = 0","Br/ $\Omega$  = 0.1","Br/ $\Omega$  = 0.2","Br/ $\Omega$  = 0.3","Br/ $\Omega$  = 0.4","Br/ $\Omega$  = 0.6","Br/ $\Omega$  = 0.8","Br/ $\Omega$  = 1")



R = linspace(0,1,100);plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+1\*0.00000016.\*R.^4),LineWidth=1.5) xlabel('R') ylabel('Ns') title('Entropy generation number as a function of R at different group parameter ') hold on plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.8\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.6\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.5\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.4\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.2\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R +1.4427./R+0.1\*0.00000016.\*R.^4),LineWidth=1.5) plot(R,-0.4328085.\*log(R)./(R.^3) -0.865617\*(1-(0.25./R.^2)./R

#### **Graph:**

+1.4427./R+0\*0.00000016.\*R.^4),LineWidth=1.5)

