# Scilab Textbook Companion for Fluid Power Theory & Applications by J. Sullivan[1]

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# Book Description

**Title:** Fluid Power Theory & Applications

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Scilab numbering policy used in this document and the relation to the above book.

**Exa** Example (Solved example)

**Eqn** Equation (Particular equation of the above book)

**AP** Appendix to Example(Scilab Code that is an Appednix to a particular Example of the above book)

For example, Exa 3.51 means solved example 3.51 of this book. Sec 2.3 means a scilab code whose theory is explained in Section 2.3 of the book.

# Contents

# List of Scilab Codes

# Chapter 2

# Applying Hydraulic Principles To Single Acting Linear Systems

**Scilab code Exa 2.1** chapter 2 example 1

```
clc
//initialisation of variables
F= 1500 //lb
L= 54 //IN
t= 12 //sec
//CALCULATIONS
hp= F*L/(t*6600)
//RESULTS
printf ('Horsepower expended at the output = %.2f hp
    ',hp)
```

**Scilab code Exa 2.2** chapter 2 example 2

```
clc
```

```
//initialisation of variables
F= 1500 //lb
t1= 10 //sec
F1= 1200 //lb
//CALCULATIONS
t2= F*t1/F1
//RESULTS
printf ('time required to raise the load = %.1f sec'
    ,t2)
```

**Scilab code Exa 2.3** chapter 2 example 3

```
clc
//initialisation of variables
d= 2 //in
F= 1000 //lb
t= 10 //sec
L= 48 //in
S= 24 //in
//CALCULATIONS
ohp= F*L/(t*6600)
Ac= %pi*d^2/4
P= ohp*t*6600/(S*Ac)
//RESULTS
printf ('Pressure within the system = %.f psi',P)
```

**Scilab code Exa 2.4** chapter 2 example 4

```
clc
//initialisation of variables
P= 1000 //psi
Q= 3 //gpm
//CALCULATIONS
```

```
Fhp= P*Q/(1714)
//RESULTS
printf ('Fluid horsepower = %.2f hp',Fhp)
```

**Scilab code Exa 2.5** chapter 2 example 5

```
clc
//initialisation of variables
Fi= 25 //lb
li= 12 //in
ni= 30
ti= 60 //sec
F0= 1000 //lb
Lo= 6 //in
to= 60 //sec
//CALCULATIONS
lhp= Fi*li*ni/(ti*6600)
Ohp= F0*Lo/(to*6600)
eo= Ohp*100/lhp
//RESULTS
printf ('overall efficiency = %.f percent',eo)
```

**Scilab code Exa 2.6** chapter 2 example 6

```
clc
//initialisation of variables
vp= 0.75 //in^3
n= 9 //strokes
t= 10 //sec
d= 2 //in
Sc= 2 //in
//CALCULATIONS
Qt= vp*n/(t*3.85)
```

```
Ac= %pi*d^2/4
Qa= Ac*Sc/(t*3.85)
s= Qt-Qa
s1= (1-(Qa/Qt))*100
ev= Qa*100/Qt
//RESULTS
printf ('Slip = %.3f gpm',s)
printf (' \n Slip perecentage= %.f percent',s1)
printf (' \n volumetric efficiency = %.f perecnt',ev
   )
```

---

**Scilab code Exa 2.7** chapter 2 example 7

```
clc
//initialisation of variables
eo= 87
em= 94
//CALCULATIONS
ee= eo*100/em
//RESULTS
printf ('Electro-mechanical efficiency = %.f percent
   ',ee)
```

---

# Chapter 3

# Determining the properties of fluids

**Scilab code Exa 3.1** chapter 3 example 1

```
clc
//initialisation of variables
M= 5//slug
g= 32 //ft/sec^2
M1= 10 //kg
g1= 9.8 //m/sec^2
M2= 15 //gm
g2= 980 //cm/sec^2
//CALCULATIONS
W= M*g
W1= M1*g1
W2= M2*g2
//RESULTS
printf ('weight = %.f lb',W)
printf ('\n weight = %.f N',W1)
printf ('\n weight = %.f dyn',W2)
```

**Scilab code Exa 3.2** chapter 3 example 2

```
clc
//initialisation of variables
M= 20 //grams
V= 25 //mm^3
//CALCULATIONS
d= M/V
d1= M*0.001/(V*0.000001)
d2= M*0.0022/(V*0.00003531)
//RESULTS
printf ('density = %.2f gm/cm^3',d)
printf ('\n density = %.f kg/m^3',d1)
printf ('\n density = %.1f slugs/ft^3',d2)
```

**Scilab code Exa 3.3** chapter 3 example 3

```
clc
//initialisation of variables
W= 7200 //lb
V= 120 //ft^3
W1= 3600 //lb
V1= 50 //m^3
W2= 500 //dyn
V2= 7000 //cm^3
//CALCULATIONS
s= W/V
s1= W1/V1
s2= W2/V2
//RESULTS
printf ('specific weight = %.f lbs/ft^3',s)
printf ('\n specific weight = %.f N/m^3',s1)
printf ('\n specific weight = %.4f dyn/cm^3',s2)
```

**Scilab code Exa 3.4** chapter 3 example 4

```
clc
//initialisation of variables
F= 200 //lb
A= 4 //in^2
//CALCULATIONS
P= F/A
//RESULTS
printf ('Pressure = %.f psi',P)
```

---

**Scilab code Exa 3.5** chapter 3 example 5

```
clc
//initialisation of variables
P= 1500 //psi
A= 2//in^2
//CALCULATIONS
F= P*A
//RESULTS
printf ('Force = %.f lb',F)
```

---

**Scilab code Exa 3.6** chapter 3 example 6

```
clc
//initialisation of variables
s= 0.85
h= 50 //ft
//CALCULATIONS
```

```
P= s*h*0.433
//RESULTS
printf ('Pressure = %.1f psi',P)
```

**Scilab code Exa 3.7** chapter 3 example 7

```
clc
//initialisation of variables
P= 1500 //psi
d= 0.78
//CALCULATIONS
h= P*2.31/d
//RESULTS
printf ('head = %.1f ft',h)
```

**Scilab code Exa 3.8** chapter 3 example 8

```
clc
//initialisation of variables
k= 0.1200
t= 225 //sec
d= 0.82
//CALCULATIONS
v= t*k
u= v*d
//RESULTS
printf ('kinematic viscosity = %.1f cP',u)
```

**Scilab code Exa 3.9** chapter 3 example 9

```
clc
//initialisation of variables
t= 80 //sec
//CALCULATIONS
v= 0.226*t-(195/t)
v1= 0.00035*t-(0.303/t)
//RESULTS
printf ('equivalent viscosity = %.2f cst',v)
printf (' \n equivalent viscosity = %.3f newtons',v1
    )
```

**Scilab code Exa 3.11** chapter 3 example 11

```
clc
//initialisation of variables
F= 45 //gm
L= 20000//gm\
r= 7.86
s= 1.27
//CALCULATIONS
CF= (F/L)*(r/s)*2*sqrt(2)
//RESULTS
printf ('coefficient of friction = %.3f ',CF)
```

# Chapter 4

# applications and testing of seals and packings

**Scilab code Exa 4.1** Chapter 4 example 1

```
clc
//initialisation of variables
d= 4 //in
p= 20 //percent
d1= 0.140
//CALCULATIONS
Gd= d-2*((100-20)*d1/100)
Gw= d1+2*(p*d1/100)
//RESULTS
printf ('Groove diameter = %.3f in',Gd)
printf (' \n Groove width = %.3f in',Gw)
printf (' \n outside diameter = %.f in',d)
```

**Scilab code Exa 4.2** Chapter 4 example 2

```
clc
```

```
//initialisation of variables
D= 2 //in
S= 10 //in
s= 10000 //strokes
V= 231 //in^3
//CALCULATIONS
di= V/(S*s*D*%pi)
//RESULTS
printf ('thickness = %.7f in',di)
```

**Scilab code Exa 4.3** Chapter 4 example 3

```
clc
//initialisation of variables
d= 0.275 //in
p= 15
p1= 20
p3= 8
//CALCULATIONS
Fs= (d*p/100)+(d*p1/100)-(d*p3/100)
Fs1= Fs*100/d
//RESULTS
printf ('final  available squeeze = %.2f percent',
   Fs1)
```

# Chapter 5

# Accounting for the energy in hydraulic systems

**Scilab code Exa 5.1** Chapter 5 example 1

```
clc
//initialisation of variables
Q= 40 //gpm
d= 2 //in
d1= 4 //in
//CALCULATIONS
v1= Q*4/(%pi*d^2*3.12)
v2= %pi*v1*4/(%pi*d1^2)
//RESULTS
printf ('velocity of fluid in the conductor = %.2f
   fps',v1)
printf (' \n  velocity of fluid in a maniflod = %.2f
    fps',v2)
```

**Scilab code Exa 5.2** chapter 5 example 2

```
clc
//initialisation of variables
Q= 18 //gpm
d= 2 //in
v2= 10 //fps
//CALCULATIONS
v1= Q*4/(%pi*d^2*3.12)
d2= sqrt(4*Q/(%pi*v2*3.12))
//RESULTS
printf ('minnimum diameter = %.3f in',d2)
```

**Scilab code Exa 5.3** chapter 5 example 3

```
clc
//initialisation of variables
Q= 10 //gpm
d= 1 //in
//CALCULATIONS
v= Q*4/(%pi*d^2*3.12)
//RESULTS
printf ('veloctity = %.1f fps',v)
```

**Scilab code Exa 5.4** chapter 5 example 4

```
clc
//initialisation of variables
S= 0.91
g= 32.2 //ft/sec^2
P1= 1000 //psi
Q= 500 //gpm
d= 3 //in
d1= 1 //in
//CALCULATIONS
```

```
v1= Q*4/(3.12*%pi*d^2)
v2= Q*4/(%pi*d1^2*3.12)
P2= ((P1*2.31/S)+(v1^2/(2*g))-(v2^2/(2*g)))*(S/2.31)
//RESULTS
printf ('pressure = %.f psi',P2-1)
```

**Scilab code Exa 5.5** chapter 5 example 5

```
clc
//initialisation of variables
P1= 1000 //psi
S= 0.85
P2= 350 //psi
Hl= 679.41 //ft
//CALCULATIONS
Ha= P1*2.31/S
He= Ha-(P2*2.31/S)-Hl
//RESULTS
//RESULTS
printf ('energy exptracted from the fluid = %.2f ft'
    ,He)
```

**Scilab code Exa 5.6** chapter 5 example 6

```
clc
//initialisation of variables
g= 32 //ft/sec^2
h= 40 //ft
//CALCULATIONS
v= sqrt(2*g*h)
//RESULTS
printf ('velocty of the fluid = %.1f fps',v)
```

**Scilab code Exa 5.7** chapter 5 example 7

```
clc
//initialisation of variables
Q= 1000 //gpm
d= 2 //in
S= 0.85
dp= 120 //psi
//CALCULATIONS
Cf= (1/38.06)*(Q*4/(%pi*d^2))*sqrt(S/dp)
//RESULTS
printf ('friction coefficient for the orifice = %.2f
    ',Cf)
```

**Scilab code Exa 5.8** chapter 5 example 8

```
clc
//initialisation of variables
Q= 100 //gpm
d= 1 //in
kv= 0.05 //N
//CALCULATIONS
v= Q*4/(3.12*%pi*d^2)
Nr= (12*v*d)/kv
//RESULTS
printf ('Reynolds number = %.f ',Nr+5)
```

**Scilab code Exa 5.9** chapter 5 example 9

```
clc
//initialisation of variables
v= 27 //cp
s= 0.85
d= 1 //in
//CALCULATIONS
V= v/s
V1= V*0.001552
V2= 2000*V1/(12*d)
V3= 4000*V1/(12*d)
//RESULTS
printf ('Critical velocity = %.2f fps',V3)
```

**Scilab code Exa 5.10** chapter 5 example 10

```
clc
//initialisation of variables
Q= 200 //gpm
d= 2 //in
S= 0.91
f= 0.05
L= 800 //ft
g= 32.2 //ft/sec^2
//CALCULATIONS
v= Q*4/(%pi*3.12*d^2)
h= 2.598*S*f*L*v^2/(2*g)
//RESULTS
printf ('Pressure drop = %.f psi',h)
```

**Scilab code Exa 5.11** chapter 5 example 11

```
clc
//initialisation of variables
```

```
Q= 15 //gpm
d= 1 //in
s= 0.85
v= 0.08 //N
L= 400 //ft
//CALCULATIONS
V= Q*4/(%pi*d^2*3.12)
Nr= 12*V*2*d/v
h= .43*s*v*L*V/d^2
//RESULTS
printf ('Pressure drop = %.2f psi',h)
```

**Scilab code Exa 5.12** chapter 5 example 12

```
clc
//initialisation of variables
Q= 1000 //gpm
d= 2 //in
V= 0.30 //N
L= 500 //ft
f= 0.034
S= 0.85
g= 32.2 //ft/sec^2
//CALCULATIONS
v= Q*4/(%pi*3.12*d^2)
Nr= (12*v*d)/V
h= 2.598*S*f*L*v^2/(2*g)
//RESULTS
printf ('Pressure drop = %.f psi',h+5)
```

**Scilab code Exa 5.13** chapter 5 example 13

```
clc
```

```
//initialisation of variables
Q= 500 //gpm
d= 2 //in
S= 0.91
kv= 0.25 //N
r= 0.0012
K= 3
f= 0.04
//CALCULATIONS
v= Q*4/(%pi*d^2*3.12)
Nr= (v*d*12)/kv
Rr= 12*r/d
Le= K*d/(f*12)
//RESULTS
printf ('equivalent length = %.1f ft',Le)
```

# Chapter 6

# Characteristics of rotary pumps

**Scilab code Exa 6.1** chapter 6 example 1

```
clc
//initialisation of variables
P= 2500 //psi
Q= 3 //gpm
p= 5 //Bhp
N= 1725 //rpm
//CALCULATIONS
eo= P*Q*100/(1714*p)
To= p*5250/N
//RESULTS
printf ('input torque = %.2f lb-ft',To)
```

**Scilab code Exa 6.2** chapter 6 example 2

```
clc
//initialisation of variables
Q= 52 //gpm
v= 3.75 //in^3
```

```
N= 3300 //rpm
//CALCULATIONS
ev= 231*Q*100/(v*N)
//RESULTS
printf ('volumetric efficiency = %.2f percent',ev)
```

**Scilab code Exa 6.3** chapter 6 example 3

```
clc
//initialisation of variables
eo= 87 //percent
ev= 94 //percent
p= 10 //bhpi
//CALCULATIONS
em= eo/ev
em1= em*100
Fhp= p*(1-em)
//RESULTS
printf ('frictional horsepower = %.1f hp',Fhp+0.1)
printf (' \n mechanical efficiency = %.2f percent',
   em1)
```

**Scilab code Exa 6.4** chapter 6 example 4

```
clc
//initialisation of variables
n= 9
N= 3000 //rpm
s= 0.75 //inch
d= 0.5 //inch
//CALCULATIONS
Q= n*N*s*%pi*d^2/(4*231)
//RESULTS
```

```
printf ('volume flow rate = %.1f gpm',Q)
```

**Scilab code Exa 6.5** chapter 6 example 5

```
clc
//initialisation of variables
d= 6 //in
N= 120 //in
Q= 5 //gpm
//CALCULATIONS
Vc= %pi*d^2*N/(4*231)
//RESULTS
printf ('minimum size of the reservoir = %.2f gpm',
   Vc)
```

# Chapter 7

# Valves in hydraulic transmission control

**Scilab code Exa 7.1** chapter 7 example1

```
clc
//initialisation of variables
Q= 30 //gpm
dp= 300 //psi
S= .85
Cv= 5.41 //
//CALCULATIONS
Cv1= Q/(sqrt(dp/S))
dp1= S*Q^2/Cv^2
//RESULTS
printf ('flow coefficient = %.3f gpm',Cv1)
printf (' \n pressure drop = %.f psi',dp1)
```

# Chapter 8

# Characteristics of Actuators

**Scilab code Exa 8.1** chapter 8 example 1

```
clc
//initialisation of variables
F= 80000 //lbs
P= 1600 //psi
//CALCULATIONS
db= sqrt(4*F/(%pi*P))
//RESULTS
printf ('size of the cylinder postion = %.f in',db)
```

**Scilab code Exa 8.2** chapter 8 example 2

```
clc
//Initialization ogf variables
Q=25 //gpm
A=.533 //in^2
//Calculations
nu=Q*19.25/(A*60) //Fluid velocity
nucylinder=Q*19.25/12.56 //Cylinder velocity
```

```
//Results
printf ('Fluid velocity = %.2f',nu)
printf ('\n Cylinder velocity = %.2f',nucylinder)
```

**Scilab code Exa 8.3** chapter 8 example 3

```
clc
//initialisation of variables
d= 3 //in
P= 2000 //psi
s= 20 //strokes
//CALCULATIONS
Cl= s*d/2
F= P*%pi*d^2/4
stl= (Cl-40)/10
//RESULTS
printf ('length of the stop tube= %.f in',Cl)
printf (' \n thrust on the rod= %.f lb',F+3)
printf (' \n Stop Tube length= %.f stl',stl)
```

**Scilab code Exa 8.4** chapter 8 example 4

```
clc
//initialisation of variables
v= 120 //ft/min
S= 1.5 //in
w= 8000 //lb
//CALCULATIONS
ga= v^2*0.0000517/S
F= w*ga
//RESULTS
printf ('total force decessary to decelarate the
    load= %.f lb',F-3)
```

**Scilab code Exa 8.5** chapter 8 example 5

```
clc
//initialisation of variables
P= 750 //psi
d= 3 //in
w= 1500 //lb
ga= 0.172
f= 0.12
v= 50 //ft/min
s= 0.75 //in
//CALCULATIONS
Fa= P*%pi*d^2/4
F= w*(ga-f)+Fa
//RESULTS
printf ('total force decessary to decelarate the
    load= %.f lb',F-2)
```

**Scilab code Exa 8.6** chapter 8 example 6

```
clc
//initialisation of variables
d= 3 //in
d1= 1.5 //in
F= 7500 //lb
//CALCULATIONS
A1= (%pi/4)*(d^2-d1^2)
P= F/A1
//RESULTS
printf ('pressure in the cylinder = %.f psi',P-1)
```

**Scilab code Exa 8.7** chapter 8 example 7

```
clc
//initialisation of variables
P= 2000 //psi
Vm= 0.5 //in^3
//CALCULATONS
T= P*Vm*0.16
//RESULTS
printf ('Theotrical torque = %.f lb-in',T)
```

**Scilab code Exa 8.8** chapter 8 example 8

```
clc
//initialisation of variables
Q= 7.5 //gpm
Vm= 2 //in^3
//CALCULATIONS
N= 231*Q/Vm
//RESULTS
printf ('Theotrical speed of fluid power = %.f rpm',
   N)
```

**Scilab code Exa 8.9** chapter 8 example 9

```
clc
//initialisation of variables
Vm= 0.55 //in^3
N= 3400 //rpm
```

```
//CALCULATIONS
Q= Vm*N/231
//RESULTS
printf ('effective flow rate = %.2f gpm',Q)
```

**Scilab code Exa 8.10** chapter 8 example 10

```
clc
//initialisation of variables
T= 32 //lb-ft
N= 1200 //rpm
P= 2000 //psi
Q= 7.5 //gpm
//CALCULATIONS
eo= T*N*100/(P*Q*3.06)
//RESULTS
printf ('overall efficiency = %.f percent',eo)
```

**Scilab code Exa 8.11** chapter 8 example 11

```
clc
//initialisation of variables
Vm= 0.6 //in^3
N= 2400 //rpm
Qa= 6.5 //gpm
p= 50
//CALCULATIONS
ev= Vm*N*100/(Qa*231)
Tf= (100-ev)*Qa/100
Cl= p*Tf/100
//RESULTS
printf ('Case drain loss = %.3f gpm',Cl)
```

**Scilab code Exa 8.12** chapter 8 example 12

```
clc
//initialisation of variables
eo= 88 //perecent
ev= 97 //percent
//CALCULATIONS
em= eo*100/ev
//RESULTS
printf ('mechanical efficency = %.2f percent',em)
```

# Chapter 9

# Hydraulic system components

**Scilab code Exa 9.1** chapter 9 example 1

```
clc
//initialisation of variables
t= 4 //hr
Ihp= 8 //ihp
Ohp= 5 //hp
//CALCULATIONS
Hl= t*2544*(Ihp-Ohp)
//RESULTS
printf ('total Btu heat loss over a period of 4hr =
   %.f Btu',Hl)
```

---

**Scilab code Exa 9.2** chapter 9 example 2

```
clc
//initialisation of variables
t= 1 //sec
P= 1000 //psi
Q= 3 //gpm
```

```
Sg= 0.85
s= 0.42
//CALCULATIONS
Hl= 2544*t*P*Q/1714
Wf= 62.4*Q*60*Sg
Tr= Hl/(Wf*s)
//RESULTS
printf ('rise in temperature of the fluid = %.2f F',
   Tr)
```

**Scilab code Exa 9.3** chapter 9 example 3

```
clc
//initialisation of variables
P= 1500 //psi
d= 12 //in
V= 50 //gal
//CALCULATIONS
F= P*(%pi*d^2/4)
S= V*231*4/(%pi*d^2)
//RESULTS
printf ('Weight = %.f lb',F)
printf ('Stroke length = %.1f in',S)
```

**Scilab code Exa 9.4** chapter 9 example 4

```
clc
//initialisation of variables
P= 1500 //psig
V= 5 //gal
P1= 3000 //psig
P2= 2000 //psig
//CALCULATIONS
```

```
V2= V*231*(P2+14.7)/(P1-P2)
V1= V2*(P1+14.7)/((P+14.7)*231)
//RESULTS
printf ('Size of accumulator = %.2f gal',V1)
```

**Scilab code Exa 9.5** chapter 9 example 5

```
clc
//Initialization of variables
beta=1.4
p3=2000+14.7 //non guage
p2=3000+14.7 //non guage
p1=1500+14.7 //non guage
deltav=1155
//Calculations
v2=(p3/p2)^(1/beta) *(deltav) /(1-(p3/p2)^(1/beta))
v1=v2*(p2/p1)^(1/beta)
perdiff=(v1-4627.25)*100/v1
//Results
printf('volume 2 = %.1f',v2)
printf('\n volume 1 = %.1f',v1)
printf('\n percentage difference in volume = %.2f',
   perdiff)
```

**Scilab code Exa 9.6** chapter 9 example 6

```
clc
//initialisation of variables
Fr= 20 //gpm
P= 2500 //psi
sf= 4
Ts= 55000 //psi
V= 15 //fps
```

```
//CALCULATIONS
A= Fr*0.3208/V
ID= 2*sqrt(A/%pi)
Wt= P*ID/(2*(Ts-P))
Wt1= Wt*sf
//RESULTS
printf ('Wall thcikness = %.3f in',Wt1)
```

# Chapter 11

# Introduction to Pneumatics

**Scilab code Exa 11.1** chapter 11 example 1

```
clc
//initialisation of variables
V1= 20 //gal
P1= 20 //psi
n= 2
//CALCULATIONS
V2= V1/n
P2= (P1+14.7)*V1*231/(V2*231)
P3= P2-14.7
//RESULTS
printf ('Guage pressure = %.1f psi',P3)
```

---

**Scilab code Exa 11.2** chapter 11 example 2

```
clc
//initialisation of variables
V1= 1500 //in^3
T= 80 //F
```

```
T1= 200 //F
//CALCULATIONS
V2= V1*(460+T1)/(T+460)
//RESULTS
printf ('volume the heated gas will occupy = %.1f in
   ^3',V2)
```

**Scilab code Exa 11.3** chapter 11 example 3

```
clc
//initialisation of variables
P1= 2000 //in^3
T= 80 //F
T1= 250 //F
//CALCULATIONS
P2= (P1+14.7)*(460+T1)/(T+460)
P3= P2-14.7
//RESULTS
printf ('guage pressure = %.f psi',P3)
```

**Scilab code Exa 11.4** chapter 11 example 4

```
clc
//initialisation of variables
P1= 2000//psi
V1= 1500 //in^3
T2= 250 //F
T1= 75 //F
V2= 1000 //in^3
//CALCULATIONS
P2= (P1+14.7)*V1*(T2+460)/((T1+460)*V2)
P3= P2-14.7
//RESULTS
```

```
printf ('guage pressure = %.f psi',P3)
```

**Scilab code Exa 11.5** chapter 11 example 5

```
clc
//initialisation of variables
s= 10 //stroke
d= 2 //in
r= 40 //cpm
P1= 80 //psi
//CALCULATIONS
V1= %pi*d^2*s*r/(4*1728)
V2= (P1+14.7)*V1/14.7
//RESULTS
printf ('air consumption in cfm of free air = %.2f
   cfm free air',V2)
```

**Scilab code Exa 11.6** chapter 11 example 6

```
clc
//initialisation of variables
V= 650 //cfm
Cr= 250 //psi
d= 2 //in
L= 500 //ft
//CALCULATIONS
CR= (Cr+14.7)/14.7
pf= 0.1025*L*(V/60)^2/(CR*d^(5.31))
//RESULTS
printf ('Pressure drop = %.f psi',pf-1)
```

**Scilab code Exa 11.7** chapter 11 example 7

```
clc
//initialisation of variables
d= 1 //in
P= 100 //psi
C= 1
T= 70 //F
s= 0.07494 //lb/ft^3
//CALCULATIONS
Qw= (0.5303*%pi*d^2*(P+14.7))/(4*sqrt(T+460))
Qv= Qw*60/s
//RESULTS
printf ('Amount of air passing thorugh orifice = %.1
   f cfm',Qv)
```

**Scilab code Exa 11.8** chapter 11 example 8

```
clc
//initialisation of variables
t= 5 //min
Qr= 10 //cfm
P1= 125 //psi
P2= 100 //psi
//CALCULATIONS
Vr= Qr*t*14.7/(P1-P2)
//RESULTS
printf ('Size of reservoir = %.1f ft^3',Vr)
```