

"Turbo"  
 "HW3 P5"  
 "Zhaoyi Jiang(.1364)"

p01=3[bar]  
 t01=600[k]  
 eta\_tt=0.8  
 phi=0.9  
 beta\_2=30[degree]  
 beta\_3=-35[degree]

phi=cz/u  
**tan**(beta\_2)=-(R-psi/2)/phi  
**tan**(beta\_3)=-(R+psi/2)/phi  
 eta\_tt=W/(h01-h03ss)  
 psi=W/(u^2\***convert**(j,kj))  
 c1=cz  
 cz=c3\***cos**(alpha\_3)  
**tan**(alpha\_3)=(1-R-psi/2)/phi

h01=**enthalpy**(*Air*,T=t01)  
 s1=**entropy**(*Air*,T=t01,P=p01)

p01/p3=1.5  
 h3ss=**enthalpy**(*Air*,P=p3,s=s1)  
 h03ss=h3ss+0.5\*c3^2\***convert**(m,km)

#### SOLUTION

##### Unit Settings: SI K bar kJ mass deg

$\alpha_3$  = 22.34 [degree]  
 c1 = 167.4 [m/s]  
 $\eta_{tt}$  = 0.8  
 h3ss = 541.2 [kJ/kg]  
 $\phi$  = 0.9  
 s1 = 6.097 [kJ/kg-K]  
 W = 39.79 [kJ/kg]

$\beta_2$  = 30 [Degree]  
 c3 = 181 [m/s]  
 h01 = 607.3 [kJ/kg]  
 p01 = 3 [bar]  
 $\psi$  = 1.15  
 t01 = 600 [K]

$\beta_3$  = -35 [Degree]  
 cz = 167.4 [m/s]  
 h03ss = 557.6 [kJ/kg]  
 p3 = 2 [bar]  
 R = 0.05529  
 u = 186 [m/s]

No unit problems were detected.