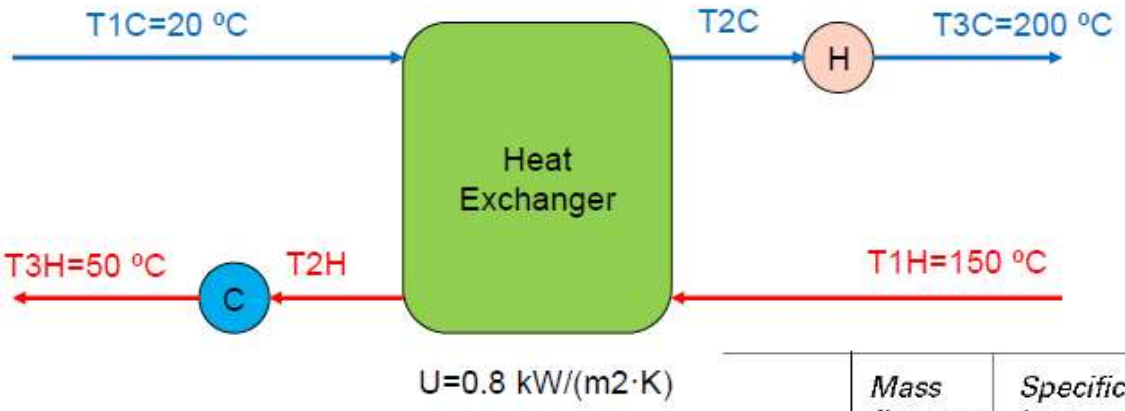
Se desea maximizar el caudal de calor intercambiado del siguiente sistema, para lo cual se dispone de dos variables de decisión (T2C y T2H)



	Mass flowrate W (kg/s)	*Specific heat capacity C_p (kJ/kgK)*
Cold stream	0.25	4
Hot stream	0.4	4.5

Requirements

conda install --yes -c conda-forge pyomo

conda install --yes -c conda-forge glpk

In [ ]:
```
from pyomo.environ import *
model = ConcreteModel()
```

Variables

In [ ]:
```
model.T2C = Var(bounds = (20,200))
model.T2H = Var(bounds = (20,150))
```

Objective function

In [ ]:
```
model.Q = Objective(expr = 1.8*(150-model.T2H), sense=maximize)
```

Constraints

In [ ]:
```
DTm = 0 # Change to 20 or whatever minimum difference temperature value considered

model.P1 = Constraint(expr = 150 - model.T2H >= 0)
model.P2 = Constraint(expr = model.T2C - 20 >= 0)
model.P3 = Constraint(expr = model.T2H - 20 >= DTm)
model.P4 = Constraint(expr = 150 - model.T2C >= DTm)
model.P5 = Constraint(expr = 1.8*(150-model.T2H)-1*(model.T2C-20)==0)
```

Solution

In [ ]:
```
results = SolverFactory('glpk').solve(model)
model.pprint()
results.write()
```

```
2 Var Declarations
    T2C : Size=1, Index=None
        Key  : Lower : Value : Upper : Fixed : Stale : Domain
        None :    20 : 150.0 :   200 : False : False :  Reals
    T2H : Size=1, Index=None
        Key  : Lower : Value            : Upper : Fixed : Stale : Domain
        None :    20 : 77.7777777777778 :   150 : False : False :  Reals

1 Objective Declarations
    Q : Size=1, Index=None, Active=True
        Key  : Active : Sense    : Expression
        None :   True : maximize : 1.8*(150 - T2H)

5 Constraint Declarations
    P1 : Size=1, Index=None, Active=True
        Key  : Lower : Body      : Upper : Active
        None :   0.0 : 150 - T2H :  +Inf :   True
    P2 : Size=1, Index=None, Active=True
        Key  : Lower : Body     : Upper : Active
        None :   0.0 : T2C - 20 :  +Inf :   True
    P3 : Size=1, Index=None, Active=True
        Key  : Lower : Body     : Upper : Active
        None :   0.0 : T2H - 20 :  +Inf :   True
    P4 : Size=1, Index=None, Active=True
        Key  : Lower : Body      : Upper : Active
        None :   0.0 : 150 - T2C :  +Inf :   True
    P5 : Size=1, Index=None, Active=True
        Key  : Lower : Body                          : Upper : Active
        None :   0.0 : 1.8*(150 - T2H) - (T2C - 20) :   0.0 :   True

8 Declarations: T2C T2H Q P1 P2 P3 P4 P5
# ==========================================================
# = Solver Results                                         =
# ==========================================================
# ----------------------------------------------------------
#   Problem Information
# ----------------------------------------------------------
Problem:
- Name: unknown
  Lower bound: 130.0
  Upper bound: 130.0
  Number of objectives: 1
  Number of constraints: 6
  Number of variables: 3
  Number of nonzeros: 7
  Sense: maximize
# ----------------------------------------------------------
#   Solver Information
# ----------------------------------------------------------
Solver:
- Status: ok
  Termination condition: optimal
  Statistics:
    Branch and bound:
      Number of bounded subproblems: 0
      Number of created subproblems: 0
  Error rc: 0
  Time: 0.07768678665161133
# ----------------------------------------------------------
#   Solution Information
```

```
# ----------------------------------------------------------
Solution:
- number of solutions: 0
  number of solutions displayed: 0
```

Computing utility consumption

In [ ]:

```
Qcold = 1.8*(value(model.T2H) - 50)
Qhot = 1*(200 - value(model.T2C))
print('Cold utility = {0:2.2f}, Hot utility = {1:2.2f}'.format(Qcold, Qhot))
```

```
Cold utility = 50.00, Hot utility = 50.00
```