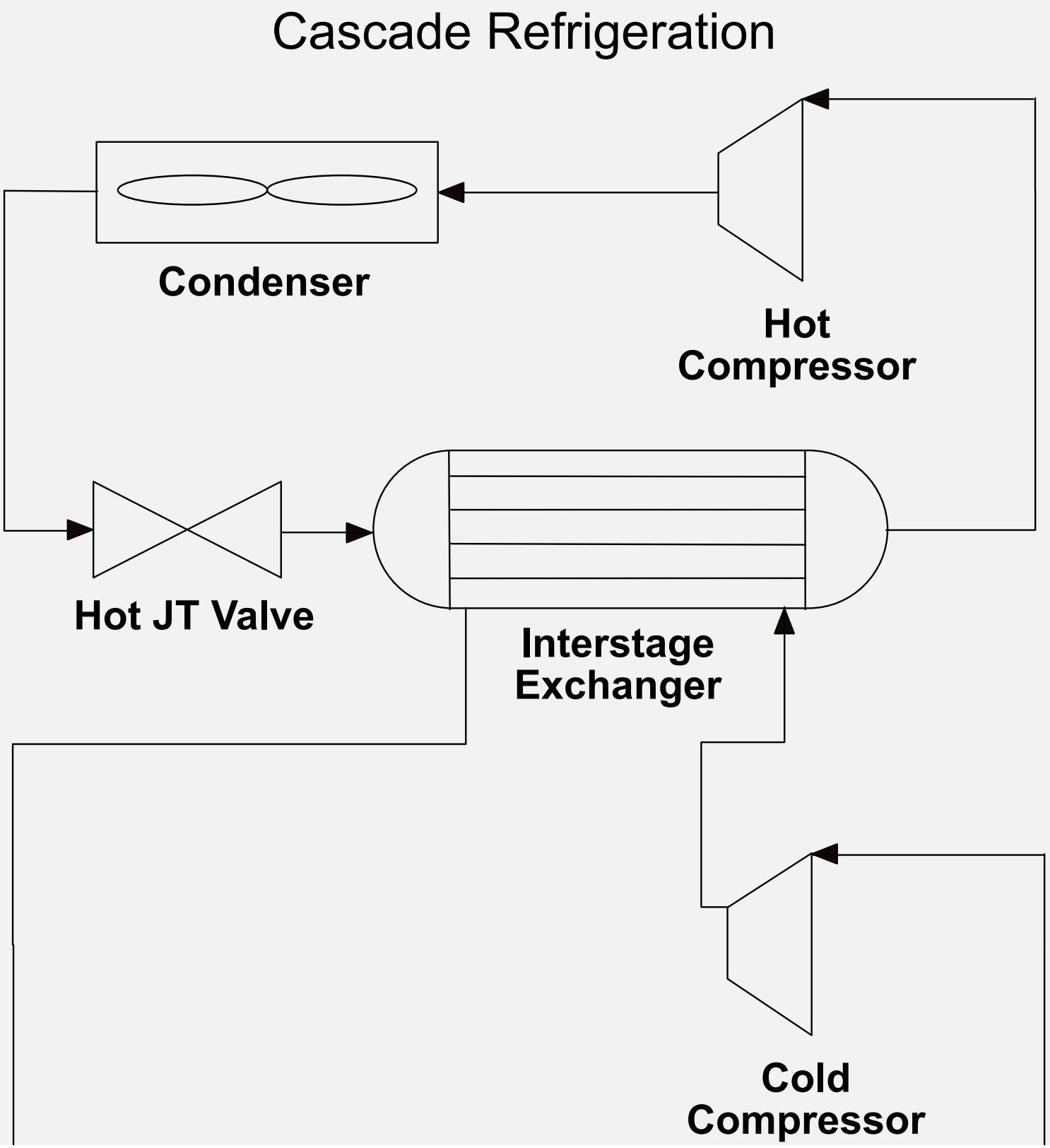
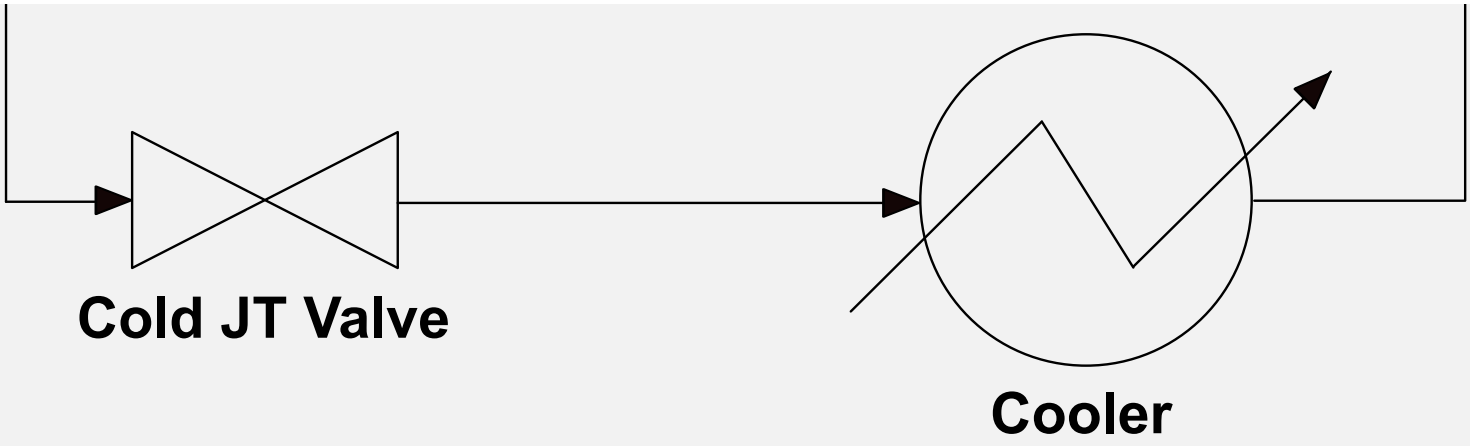
Cascade Refrigeration

This model represents a cascade refrigeration system with a high temperature loop (**HTCycle**) and a low temperature one (**LTCycle**), which have different refrigerants.

The process would look something like this:





Essentially the chiller for the hot loop is the condenser for the cold loop.

The calculation is accomplished by using two refrigeration models from the **Getting Started** session tool box, with the high temperature one using ammonia as the refrigerant and the low temperature one using carbon dioxide.

The exchanger between the two is simply a heat flow, but an additional calculation is done to determine its LMTD.

ColdT	-45 degc
CondT	40 degc
CoolerDP	20 kpa
CondDp	35 kpa
InletQ	300 kw
InterDT	5 deltac
HTInterT	-5 degc
HTInterDp	20 kpa
LTInterDP	35 kpa

Thermo

Cycle	Thermo
High Temp	Ammonia
Low Temp	CarbonDioxide

LTCompPower	111.40 kW

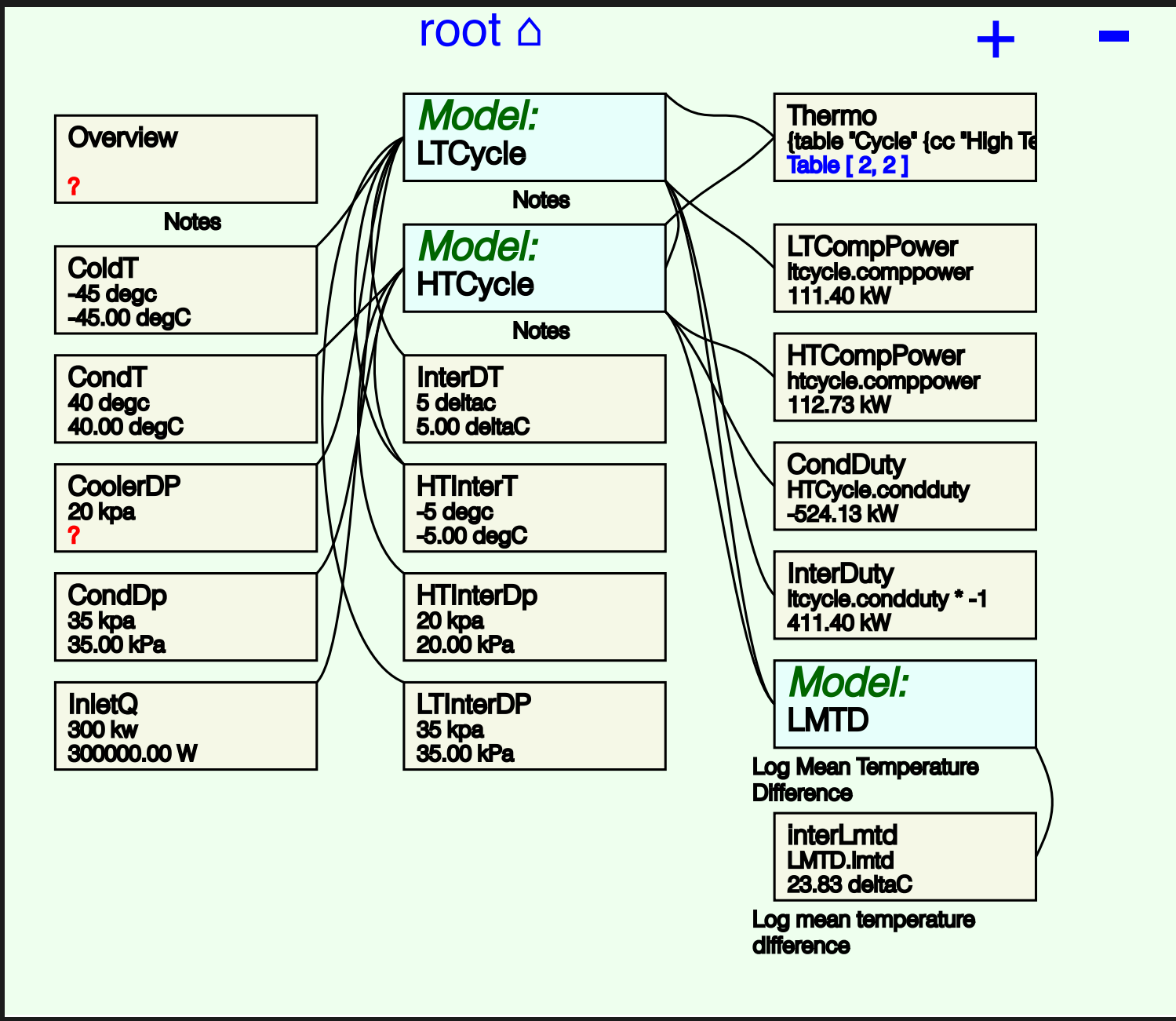
HTCompPower	112.73 kW

CondDuty	524.13 kW

CondDuty	-524.13 kW

InterDuty	411.40 kW

interLmtd	23.83 deltaC


root ⌂
+
−
Overview
?
Notes
ColdT
-45 degc
-45.00 degC
CondT
40 degc
40.00 degC
CoolerDP
20 kpa
?
CondDp
35 kpa
35.00 kPa
InletQ
300 kw
300000.00 W
Model:
LTCycle
Notes
Model:
HTCycle
Notes
InterDT
5 deltac
5.00 deltaC
HTInterT
-5 degc
-5.00 degC
HTInterDp
20 kpa
20.00 kPa
LTInterDP
35 kpa
35.00 kPa
Thermo
{table "Cycle" {cc "High Te
Table [2, 2]
LTCompPower
ltcycle.comppower
111.40 kW
HTCompPower
htcycle.comppower
112.73 kW
CondDuty
HTCycle.condduty
-524.13 kW
InterDuty
ltcycle.condduty * -1
411.40 kW
Model:
LMTD
Log Mean Temperature Difference
interLmtd
LMTD.lmtd
23.83 deltaC
Log mean temperature difference
Info
Sessions
Console
Undo
Redo
Units