Università di Genova

Exercise 2

Group 36

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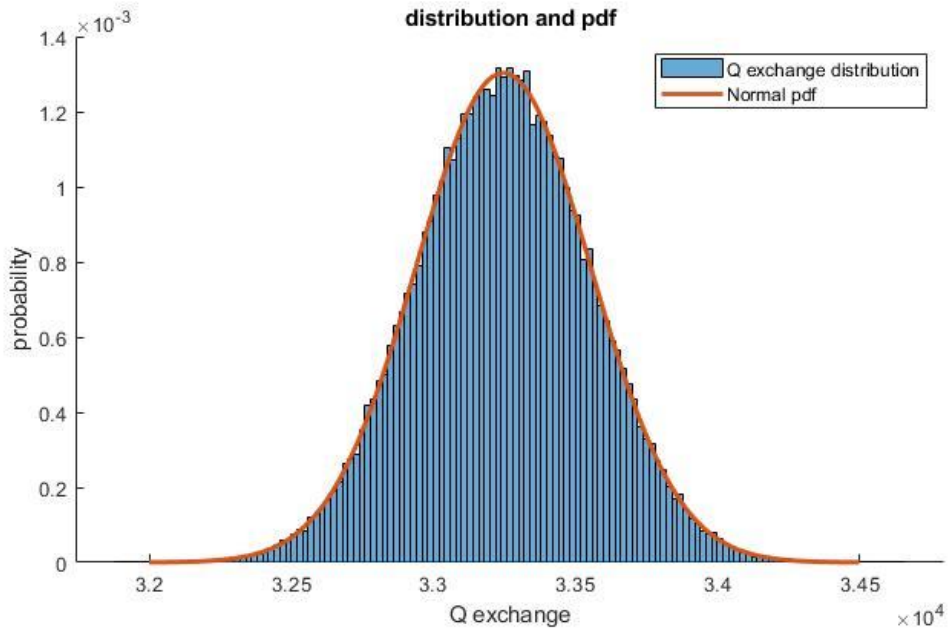
1. By running the MC with 10^5 samples, mean = 3.32×10^4 and standard deviation= 3.06×10^2,

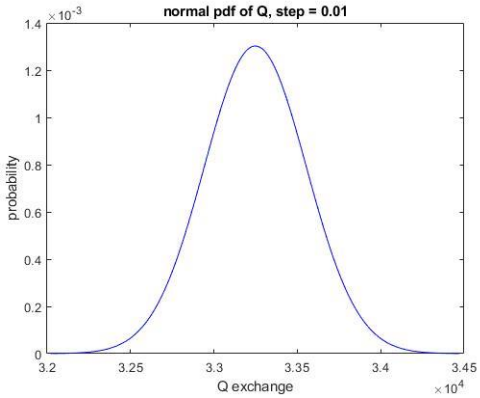
In this exercise the distribution generated for Q_Exchange of Parallel Flow by considering variables $\dot{m}_{hot} = 580 \pm 5\ kg/s, \dot{m}_{cold} = 130 \pm 2\ kg/s, T_{hot} = 523 \pm 2\ K$

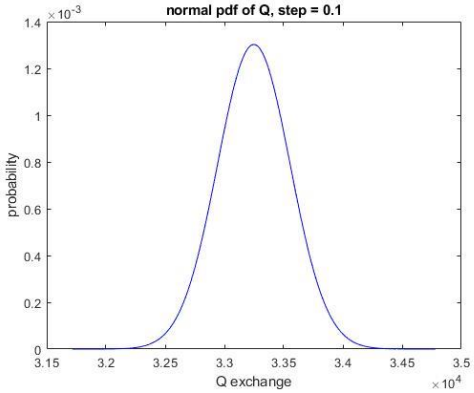


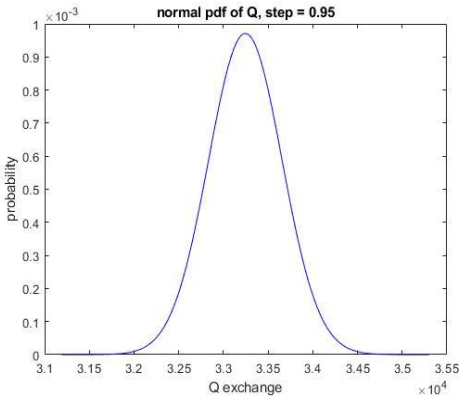
2, 3. The purpose of this exercise is to compare the RSA method with sizes 0.01, 0.1, 1 and 10 with the MC method. By using step = 1 the function generates nan as output. So, we used 0.95 instead of 1.

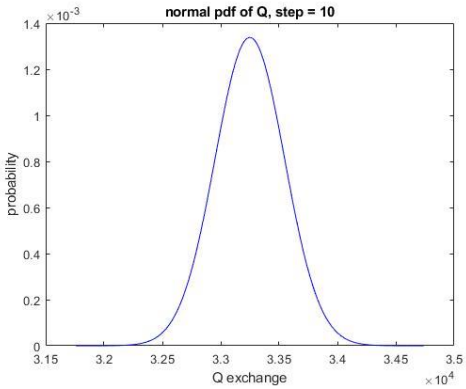
The table below specifies the mean and std values of the problem also the distributions visualized in following figures. Due to the diagram and obtained results all step sizes generate similar mean as MC but in step size of 0.01 and 0.1, RSA generates similar results for STD as MC. So, 0.01 and 0.1 are acceptable values for RSA which generates values equal to MC values.

step	mean	std
0.01	3.32×10^4	3.06×10^2
0.1	3.32×10^4	3.06×10^2
0.95	3.32×10^4	4.10×10^2
10	3.32×10^4	2.98×10^2

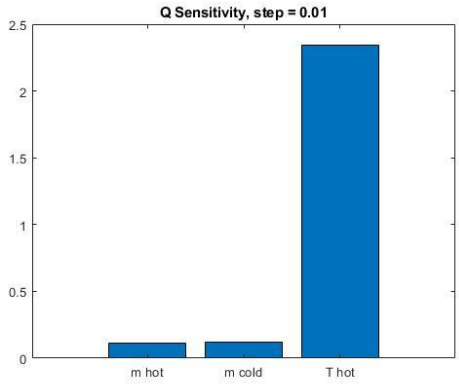


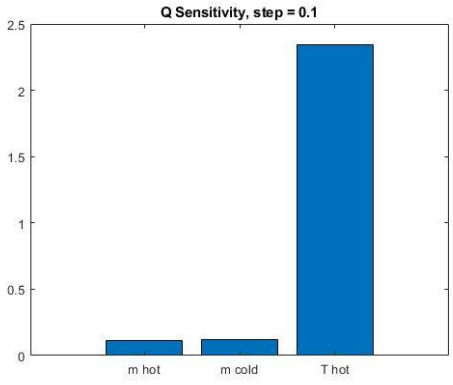


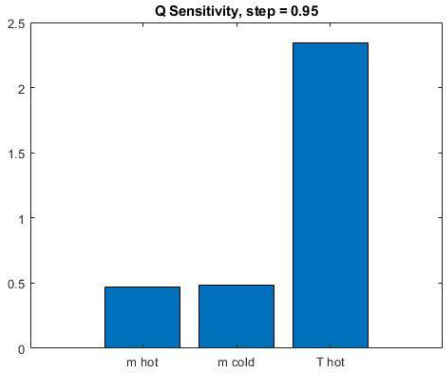


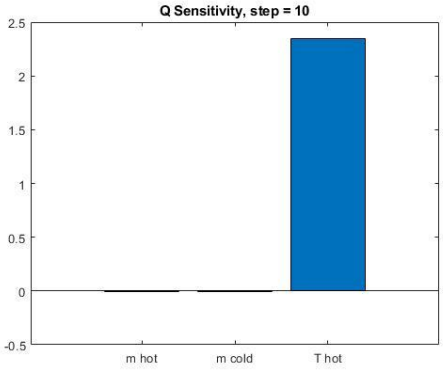


4. Following diagrams describe the sensitivity, as can be seen in size of 0.01 and 0.1 Q_Exchange is related on all three indexes ($\dot{m}_{hot}$,$\dot{m}_{cold}$, T_{hot}) in a positive direction and are correlated with each other. Diagrams show that T_{hot} is the most effective indicator and two others have the similar effect in a positive direction but in compare to T_{hot}, their effect is so small.


Q Sensitivity, step = 0.01
2.5
2
1.5
1
0.5
0
m hot
m cold
T hot


Q Sensitivity, step = 0.1
2.5
2
1.5
1
0.5
0
m hot
m cold
T hot


Q Sensitivity, step = 0.95
2.5
2
1.5
1
0.5
0
m hot
m cold
T hot


Q Sensitivity, step = 10
2.5
2
1.5
1
0.5
0
-0.5
m hot
m cold
T hot