Project 3

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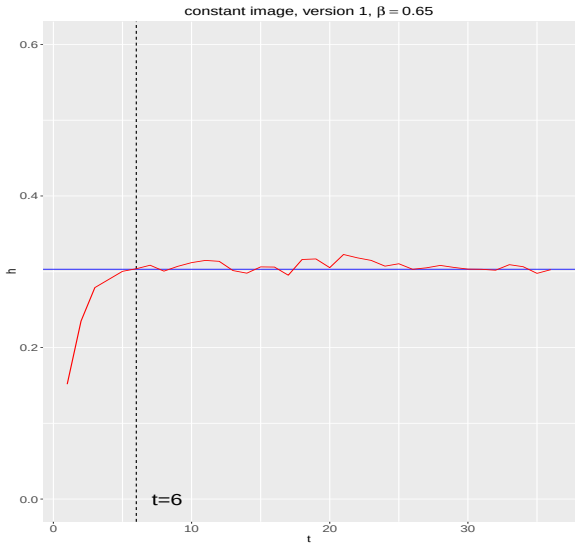
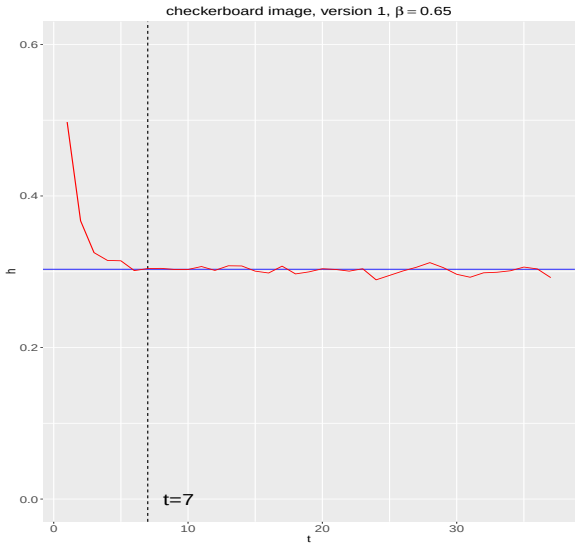
P1
The graphs are on page 2,3.

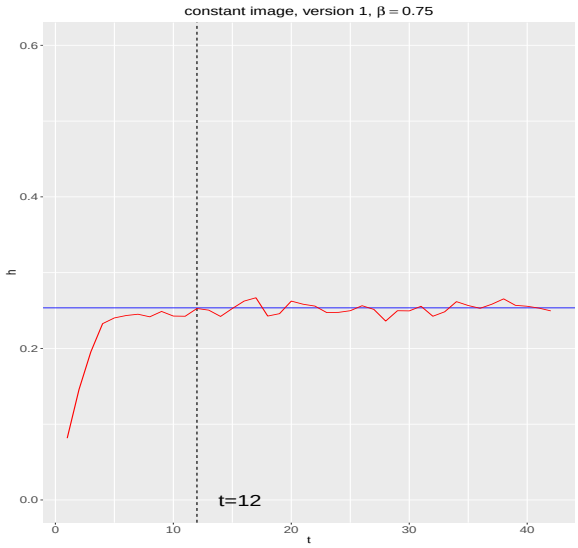
- When β becomes larger, more sweeps are needed to make $H(X)$ converge to h^*.
- When β becomes larger, h^* become smaller.
- It's hard to say which version of method is better. But based on the graphs, version 2 is better.
- Obviously, checkerboard image starts h from 1 while constant image starts from 0.

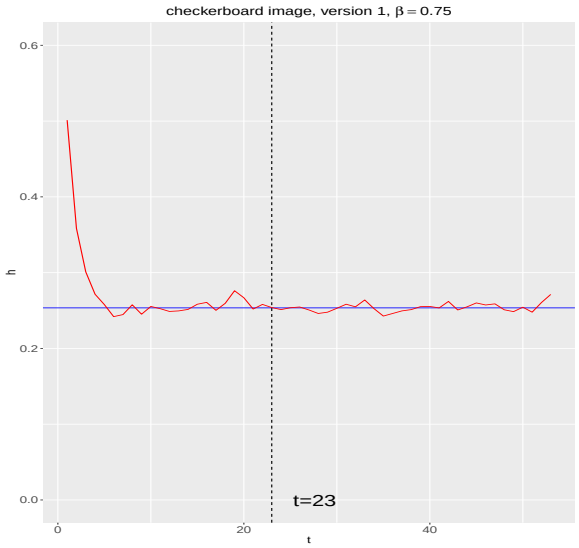
P2
It's hard to display the sweeps for Gibbs Sampler since the sweeps are too large. So I show it in the following table.

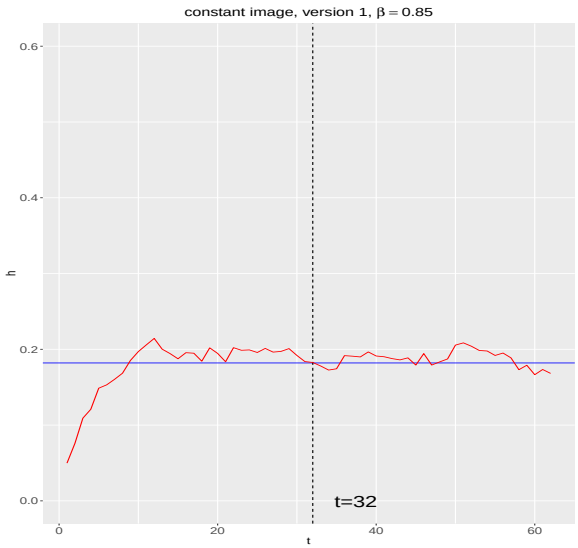
	β					
	0.65		0.75		0.85	
	MC1	MC2	MC1	MC2	MC1	MC2
Version 1	6	7	12	23	32	25
Version 2	5.01	8.85	9.52	16.17	17.12	25.54
Gibbs	54	54	158	158	1740	1740

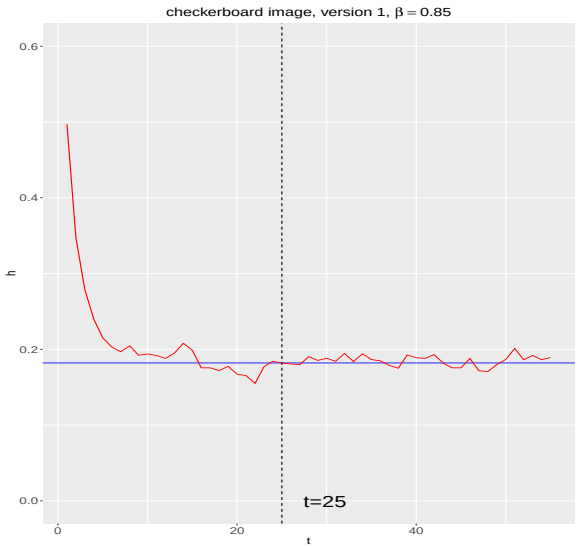

constant image, version 1, β = 0.65
h
t
t=6

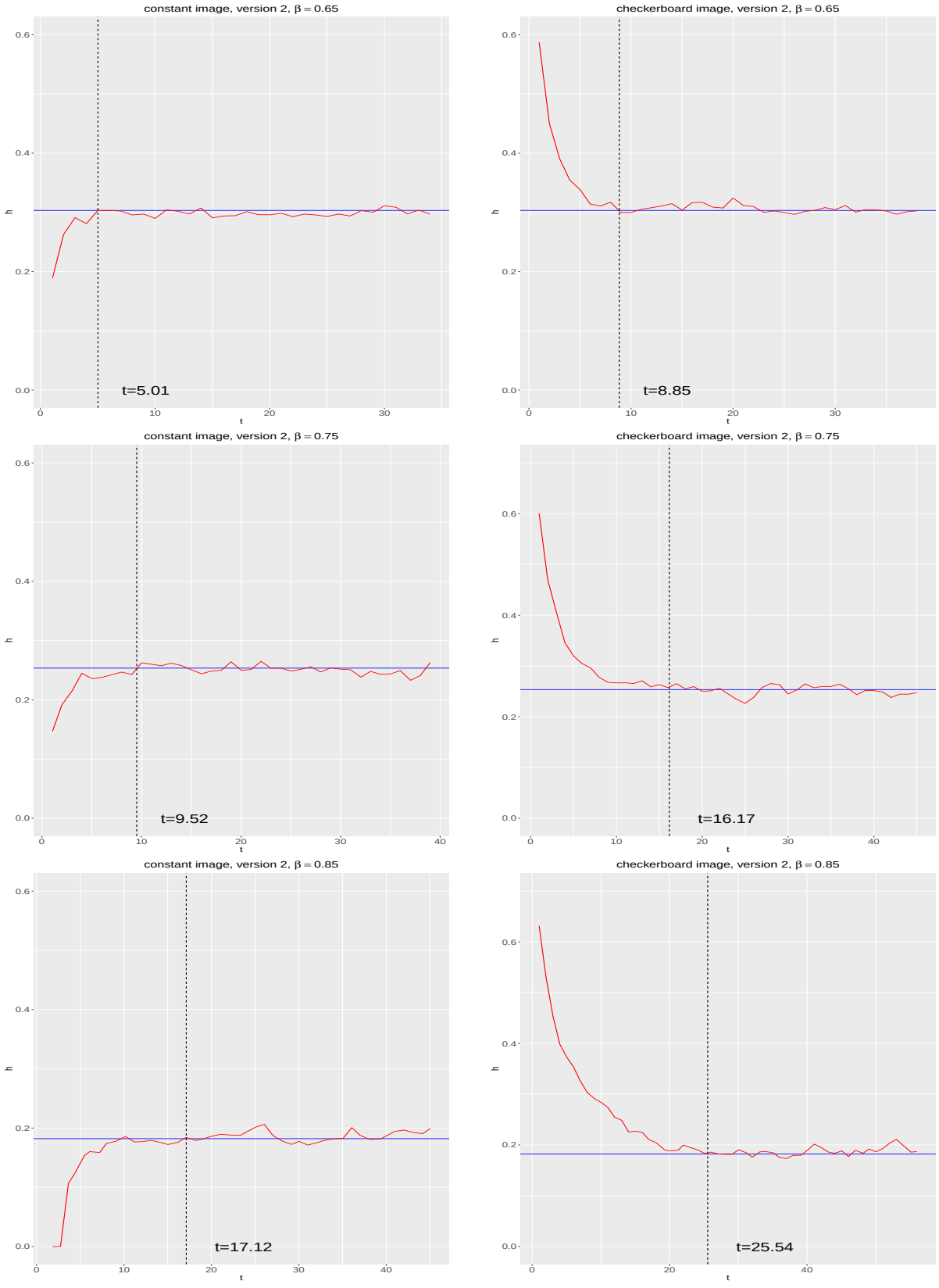

checkerboard image, version 1, β = 0.65
h
t
t=7


constant image, version 1, β = 0.75
h
t
t=12


checkerboard image, version 1, β = 0.75
h
t
t=23

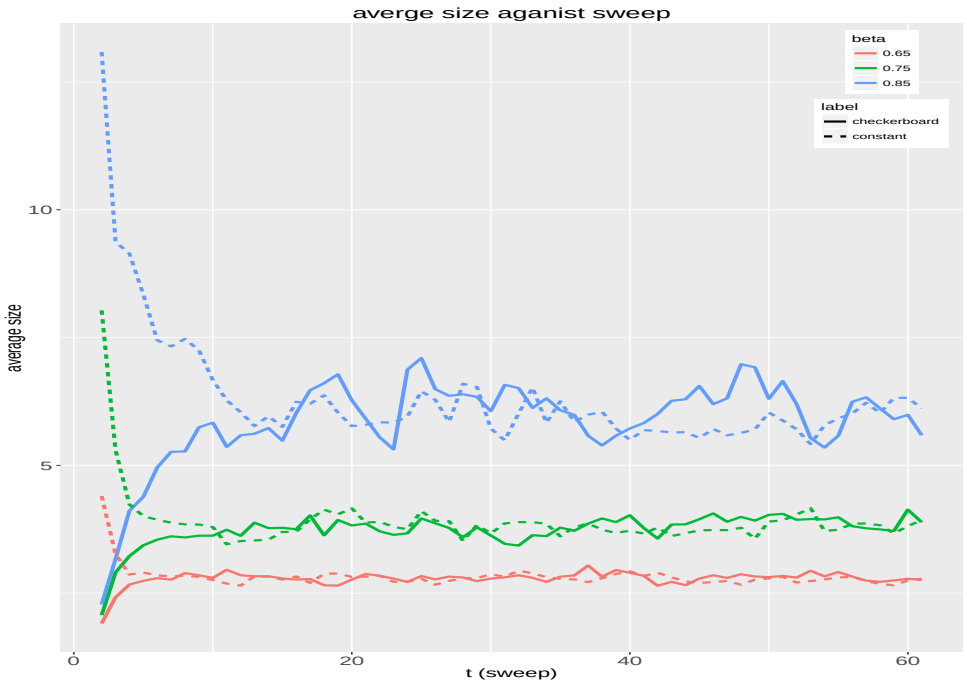

constant image, version 1, β = 0.85
h
t
t=32


checkerboard image, version 1, β = 0.85
h
t
t=25


constant image, version 2, β = 0.65
checkerboard image, version 2, β = 0.65
constant image, version 2, β = 0.75
checkerboard image, version 2, β = 0.75
constant image, version 2, β = 0.85
checkerboard image, version 2, β = 0.85
t=5.01
t=8.85
t=9.52
t=16.17
t=17.12
t=25.54
h
t

P3

The bigger β is, the lower average size of clusters is.



P4

It converges very fast and only takes about 52 sweeps.