

2. Scenario 2 - Fair Coin

2.1. Posterior plot

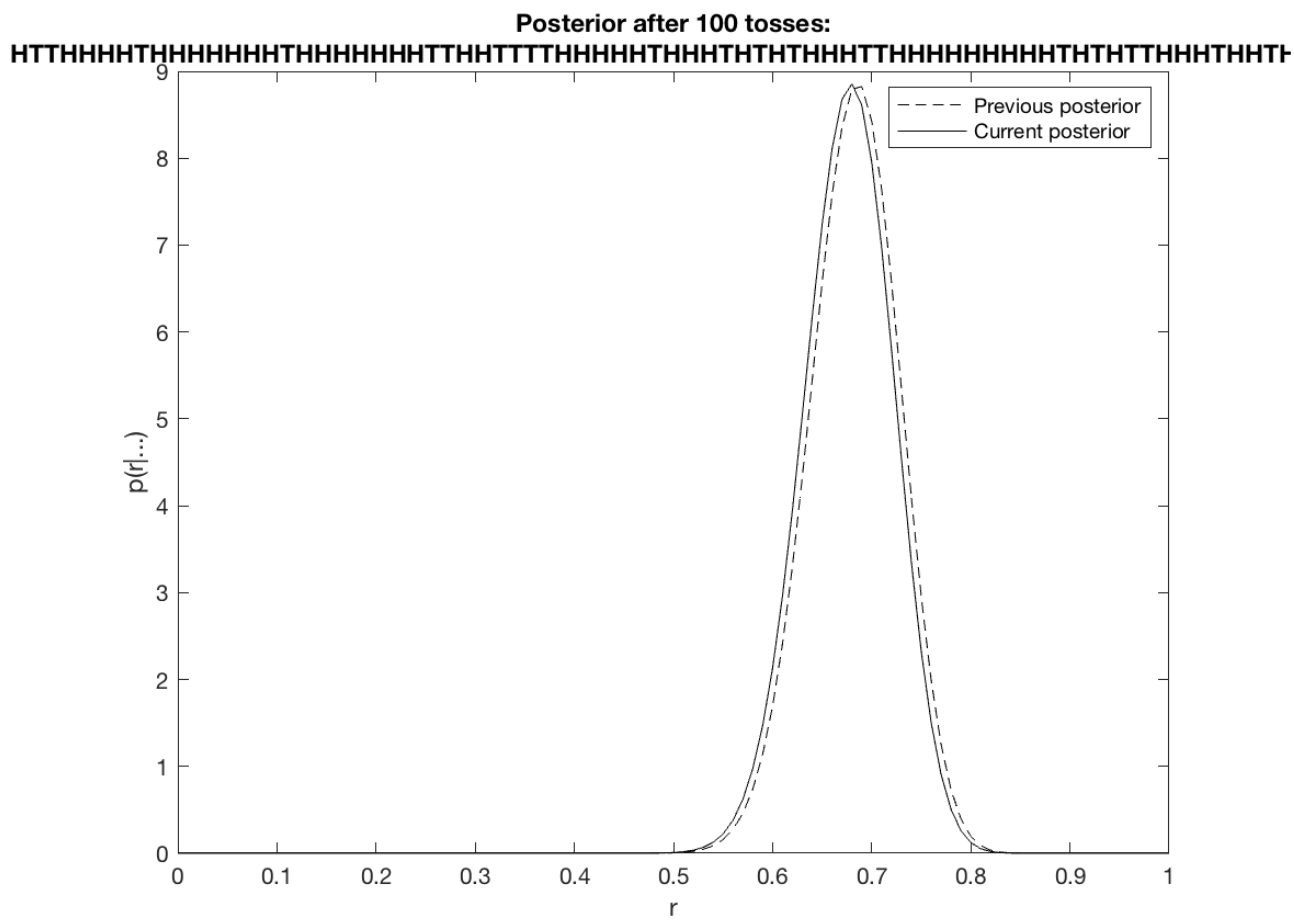
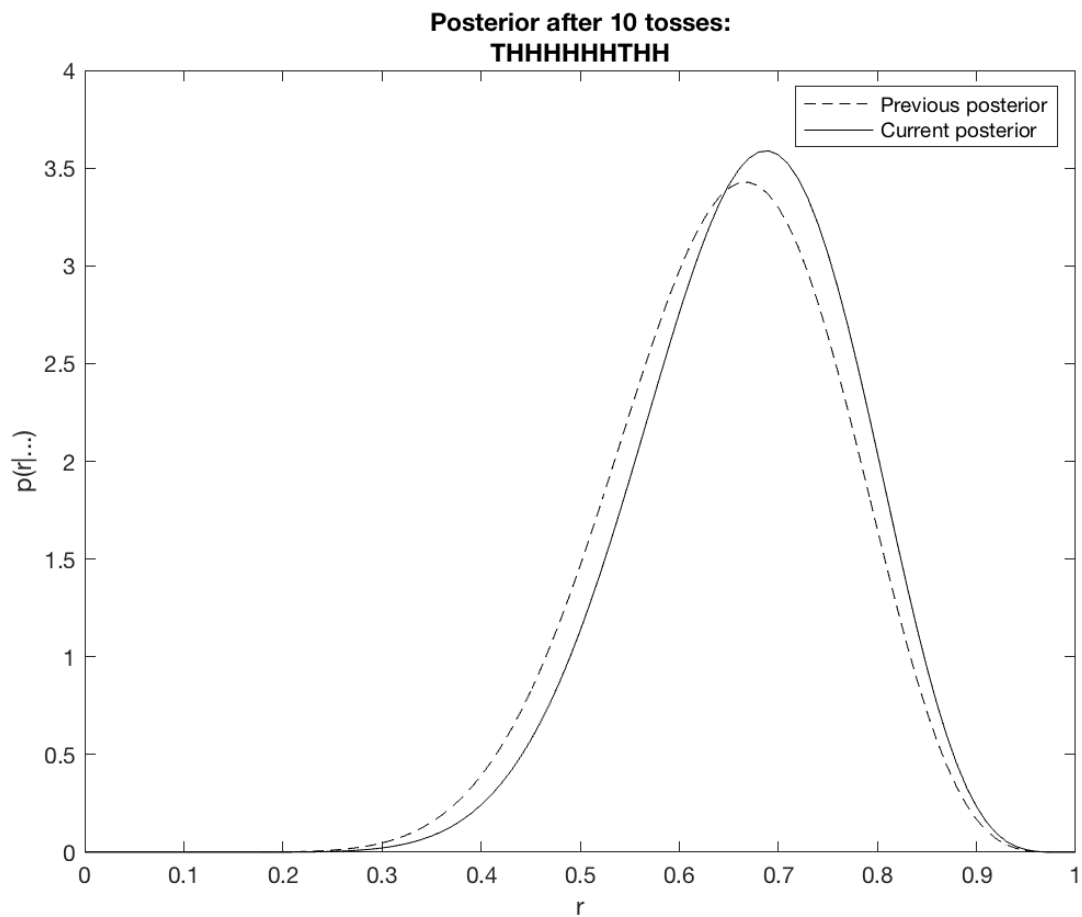
```
%% coin_scenario.m
clear all; close all; warning('off');
%% Inputs
alpha = 4;
beta = 4;
p = 0.7;
num_toss = 100;

fprintf('\nInputs:\n');
fprintf('-----\n');
fprintf('number of tosses = %i\n', num_toss);
fprintf('probability of head = %i\n', p);
fprintf('alpha = %i\n', alpha);
fprintf('beta = %d\n', beta);
fprintf('*****\n');

%% Compute final gamma and theta
[post_alpha, post_beta] = bayesian_way(p, num_toss, alpha, beta);

%% Compute and print out the probability of winning p_hat
[y_n, r_hat, p_hat] = prob_win(post_alpha, post_beta, alpha, num_toss);
fprintf('\nCompute the probability of winning\n');
fprintf('-----\n');
fprintf('theta = %i\n', post_alpha);
fprintf('gamma = %i\n', post_beta);
fprintf('r_hat = %d\n', r_hat);
fprintf('YN = %i\n', y_n);
fprintf('Probability of winning = %d\n', p_hat); % print the probability of winning
fprintf('*****\n');

%% Compute and print out the marginal likelihoods
fprintf('\nCompute the marginal likelihoods\n');
fprintf('-----\n');
fprintf('alpha = %i\n', alpha);
fprintf('beta = %i\n', beta);
fprintf('YN = %i\n', y_n);
fprintf('N = %i\n', num_toss);
m_likelihoods = ml(alpha, beta, y_n, num_toss); % print the marginal likelihoods
fprintf('Marginal likelihoods = %d\n', m_likelihoods);
fprintf('*****\n\n');
```



2.2. Probabilities of winning

>> coin_scenario

```
Compute the probability of winning
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theta = 73

gamma  = 35

r_hat = 6.759259e-01

YN = 69

Probability of winning = 6.542038e-01

*****
```

2.3. Marginal likelihoods

```
Compute the marginal likelihoods
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alpha = 4

beta  = 4

YN = 69

N  = 100

Marginal likelihoods = 4.927098e-01

*****
```