## Code and the learned parameter vector

3(d).

**MaximumLikelihood.m**

function [p] = MaximumLikelihood(X)

[m, n] = size(X);

p = zeros(n, 1);

for i = 1:n

sum = 0;

for j = 1:m

sum = sum + X(j, i);

end

p(i) = sum / m;

end

**Result**

p =

0.1300

0.2100

0.2900

0.4300

0.6400

0.7700

0.6900

0.5000

0.0800

0.2500

0.4500

0.6400

0.7200

0.7000

0.7900

0.4800

0.1300

0.3000

0.4500

0.3900

0.2700

0.2500

0.5000

0.5200

0.1900

0.4500

0.4800

0.3100

0.2900

0.2500

0.4400

0.4000

0.3200

0.3900

0.1900

0.2600

0.2300

0.4000

0.5400

0.2600

0.4700

0.3300

0.1300

0.1400

0.2800

0.4400

0.4800

0.1700

0.6000

0.5900

0.3500

0.4400

0.5700

0.5200

0.2900

0.0400

0.2800

0.6600

0.7600

0.7700

0.4200

0.1900

0.0500

0

3(e).

**MaximumAPosteriori.m**

function [p] = MaximumAPosteriori(X)

Alpha = 3;

Beta = 3;

[m, n] = size(X);

for i = 1:n

sum = 0;

for j = 1:m

sum = sum + X(j, i);

end

p(i) = (sum + (Alpha - 1)) / (m + Alpha + Beta - 2);

end

**Result**

p =

0.1442

0.2212

0.2981

0.4327

0.6346

0.7596

0.6827

0.5000

0.0962

0.2596

0.4519

0.6346

0.7115

0.6923

0.7788

0.4808

0.1442

0.3077

0.4519

0.3942

0.2788

0.2596

0.5000

0.5192

0.2019

0.4519

0.4808

0.3173

0.2981

0.2596

0.4423

0.4038

0.3269

0.3942

0.2019

0.2692

0.2404

0.4038

0.5385

0.2692

0.4712

0.3365

0.1442

0.1538

0.2885

0.4423

0.4808

0.1827

0.5962

0.5865

0.3558

0.4423

0.5673

0.5192

0.2981

0.0577

0.2885

0.6538

0.7500

0.7596

0.4231

0.2019

0.0673

0.0192

4.

**ModelSelection.m**

function [p1,p2,p3] = ModelSelection(X)

N = 100;

D = 64;

A = 3;

B = 3;

p1 = 1;

p2 = 1;

p3 = 1;

s = 0;

[m,n] = size(X);

s = ((0.5)^(N)\*(((1/beta(A,B))\*(0.5)^(A+B-2))))^(1/N);

p1 = p1 \* s; %Model (a)

sum = 0;

for i = 1:m

for j = 1:n

if X(i,j) == 1

sum = sum+1;

end

end

end

syms x

s = int((x.^(sum))\*((1-x).^(N\*D-sum))\*((1./beta(A,B))\*(x.^(A-1))\*((1-x).^(B-1)))^D,0,1);

p2 = double(s^(1/(N\*D))); %Model (b)

syms x

for j = 1:n

sum = 0;

for i = 1:m

if X(i,j) == 1

sum = sum+1;

end

s = int((x.^(sum))\*((1-x).^(N-sum))\*((1./beta(A,B))\*(x.^(A-1))\*((1-x).^(B-1)))^1,0,1);

p3 = p3 \* double(s);

p3 = p3^(1/(N\*D)); %Model (c)

end

end