Lab 01 Observations

QNo1

The sequences of the numbers generated by the Linear Congruence Generator with a = 6 and x_0 ranging from 0 to 10

0	0	0	0	0	0	0	0	0	0	0
1	6	3	7	9	10	5	8	4	2	1
2	1	6	3	7	9	10	5	8	4	2
3	7	9	10	5	8	4	2	1	6	3
4	2	1	6	3	7	9	10	5	8	4
5	8	4	2	1	6	3	7	9	10	5
6	3	7	9	10	5	8	4	2	1	6
7	9	10	5	8	4	2	1	6	3	7
8	4	2	1	6	3	7	9	10	5	8
9	10	5	8	4	2	1	6	3	7	9
10	5	8	4	2	1	6	3	7	9	10

The sequences of the numbers generated by the Linear Congruence Generator with a = 3 and x_0 ranging from 0 to 10

0	0	0	0	0	0	0	0	0	0	0
1	3	9	5	4	1	3	9	5	4	1
2	6	7	10	8	2	6	7	10	8	2
3	9	5	4	1	3	9	5	4	1	3
4	1	3	9	5	4	1	3	9	5	4
5	4	1	3	9	5	4	1	3	9	5
6	7	10	8	2	6	7	10	8	2	6
7	10	8	2	6	7	10	8	2	6	7
8	2	6	7	10	8	2	6	7	10	8
9	5	4	1	3	9	5	4	1	3	9
10	8	2	6	7	10	8	2	6	7	10

Each row represents a sequence with the first element as seed. When a = 6 we observe a repetition in the values with a period of 10 (= m-1) while in the second case with a = 3 repetition is observed with a period of 5. So the Linear congruential generator with multiplier = 6 has full period so it is better than the other one with a = 3.

QNo2

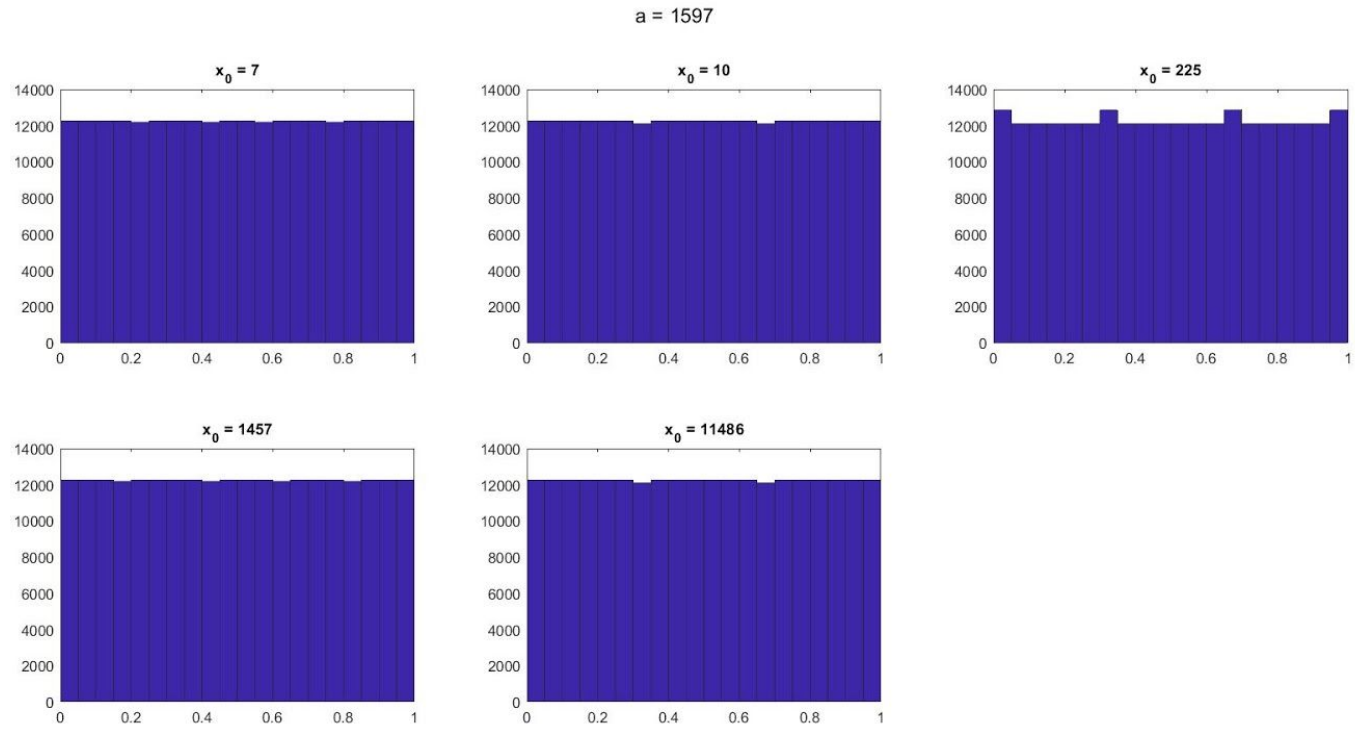
For a = 1597

Frequencies	seed = 7	seed = 10	seed = 225	seed = 1457	seed = 11486
0.00-0.05	12264	12264	12096	12264	12264
0.05-0.10	12264	12264	12852	12264	12264
0.10-0.15	12264	12264	12096	12264	12264
0.15-0.20	12264	12264	12096	12180	12264
0.20-0.25	12180	12264	12096	12264	12264
0.25-0.30	12264	12264	12096	12264	12264
0.30-0.35	12264	12264	12852	12264	12096
0.35-0.40	12264	12264	12096	12264	12264
0.40-0.45	12264	12264	12096	12180	12264
0.45-0.50	12180	12096	12096	12264	12264
0.50-0.55	12264	12264	12096	12264	12264
0.55-0.60	12264	12264	12852	12264	12264
0.60-0.65	12264	12264	12096	12264	12264
0.65-0.70	12264	12264	12096	12180	12264
0.70-0.75	12180	12264	12096	12264	12264
0.75-0.80	12264	12264	12096	12264	12264
0.80-0.85	12264	12264	12852	12264	12096
0.85-0.90	12264	12264	12096	12264	12264
0.90-0.95	12264	12264	12096	12180	12264
0.95-1.00	12180	12096	12096	12264	12264

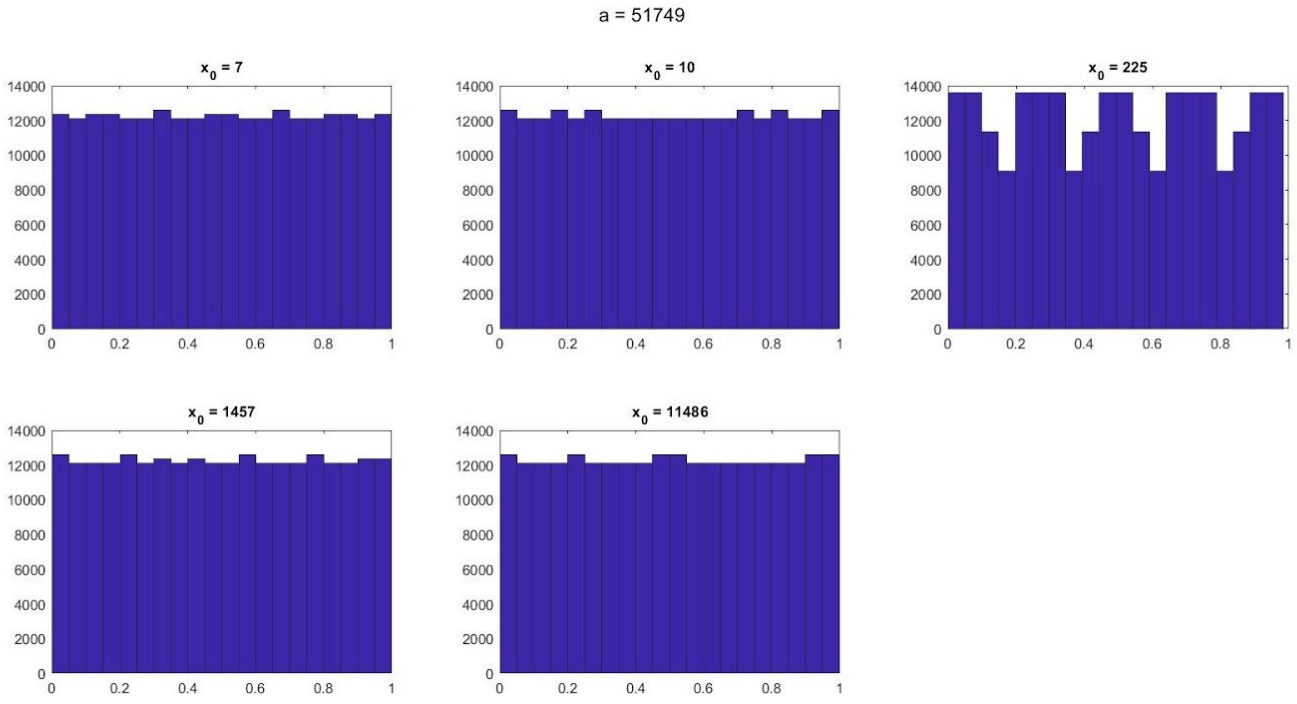
For a = 51749

Frequencies	seed = 7	seed = 10	seed = 225	seed = 1457	seed = 11486
0.00-0.05	12348	12600	13608	12096	12600
0.05-0.10	12096	12096	13608	12348	12096
0.10-0.15	12348	12600	11340	12348	12096
0.15-0.20	12348	12096	9072	12096	12096
0.20-0.25	12096	12600	13608	12096	12600
0.25-0.30	12348	12096	13608	12600	12096
0.30-0.35	12348	12096	13608	12096	12096
0.35-0.40	12096	12096	13608	12348	12096
0.40-0.45	12096	12096	9072	12096	12600
0.45-0.50	12348	12096	11340	12348	12600
0.50-0.55	12348	12600	13608	12096	12096
0.55-0.60	12096	12096	13608	12348	12096
0.60-0.65	12348	12600	11340	12348	12096
0.65-0.70	12348	12096	9072	12096	12096
0.70-0.75	12096	12600	13608	12096	12096
0.75-0.80	12348	12096	13608	12600	12600
0.80-0.85	12348	12096	13608	12096	12600
0.85-0.90	12096	12096	13608	12348	12096
0.90-0.95	12096	12096	9072	12096	12096
0.95-1.00	12348	12096	11340	12348	12096

Bar graph for a = 1597



Bar graph for a = 51749



QNo3

The 2 dimensional plot of (u_{i-1}, u_i) generated by the Linear congruence generator with a = 1229, b = 1, m = 2048