Erlang-B

Enunciado

Valores Definidos	Erlang-B	
	1 a)	
m (channels)	8	
l (arrival rate/hour)	0,009	
lambda (calls/hour)	180	
dm (min)	2	
L (buffer size)	0	
K (population size)	20 000	

Resultados

Valores Definidos	Erlang-B
	1 a)
B	12%
P(A>0)	0%
Am (sec)	0

Erlang-B

Index	Delay	Pa(a<index)	Sum Delays
0	3263	1,71%	3263
1	3183	3,37%	6446
2	3225	5,06%	9671
3	3064	6,66%	12735
4	3047	8,26%	15782
5	2969	9,81%	18751
6	2808	11,28%	21559
7	2852	12,77%	24411
8	2834	14,25%	27245
9	2698	15,67%	29943
10	2663	17,06%	32606
11	2606	18,42%	35212
12	2595	19,78%	37807
13	2604	21,14%	40411
14	2392	22,39%	42803
15	2425	23,66%	45228
16	2397	24,92%	47625
17	2591	26,27%	50216
18	2356	27,51%	52572
19	2401	28,76%	54973
20	2326	29,98%	57299
21	2269	31,17%	59568
22	2193	32,31%	61761
23	2260	33,50%	64021
24	2145	34,62%	66166
25	2044	35,69%	68210
26	2143	36,81%	70353
27	2027	37,87%	72380
28	2061	38,95%	74441
29	2092	40,04%	76533
30	1907	41,04%	78440
31	1854	42,01%	80294
32	1801	42,95%	82095
33	1857	43,92%	83952
34	1843	44,89%	85795
35	1768	45,81%	87563
36	1709	46,71%	89272
37	1737	47,62%	91009
38	1659	48,48%	92668
39	1603	49,32%	94271
40	1617	50,17%	95888
41	1549	50,98%	97437
42	1611	51,82%	99048
43	1500	52,61%	100548
44	1557	53,42%	102105
45	1447	54,18%	103552
46	1453	54,94%	105005
47	1436	55,69%	106441
48	1388	56,42%	107829
49	1406	57,15%	109235
50	1379	57,87%	110614
51	1374	58,59%	111988

Enunciado

Valores Definidos	Erlang-B	
	1 a)	1 b)
m (channels)	8	8
l (arrival rate/hour)	0,009	0,009
lambda (calls/hour)	180	180
dm (min)	2	2
L (buffer size)	0	1 000
K (population size)	20 000	20 000

Resultados

Valores Definidos	Erlang-B	
	1 a)	1 b)
B	12%	0%
P(A>0)	0%	35,7%
Am (sec)	0	21,041

■ Delay

■ Pa(a<index)
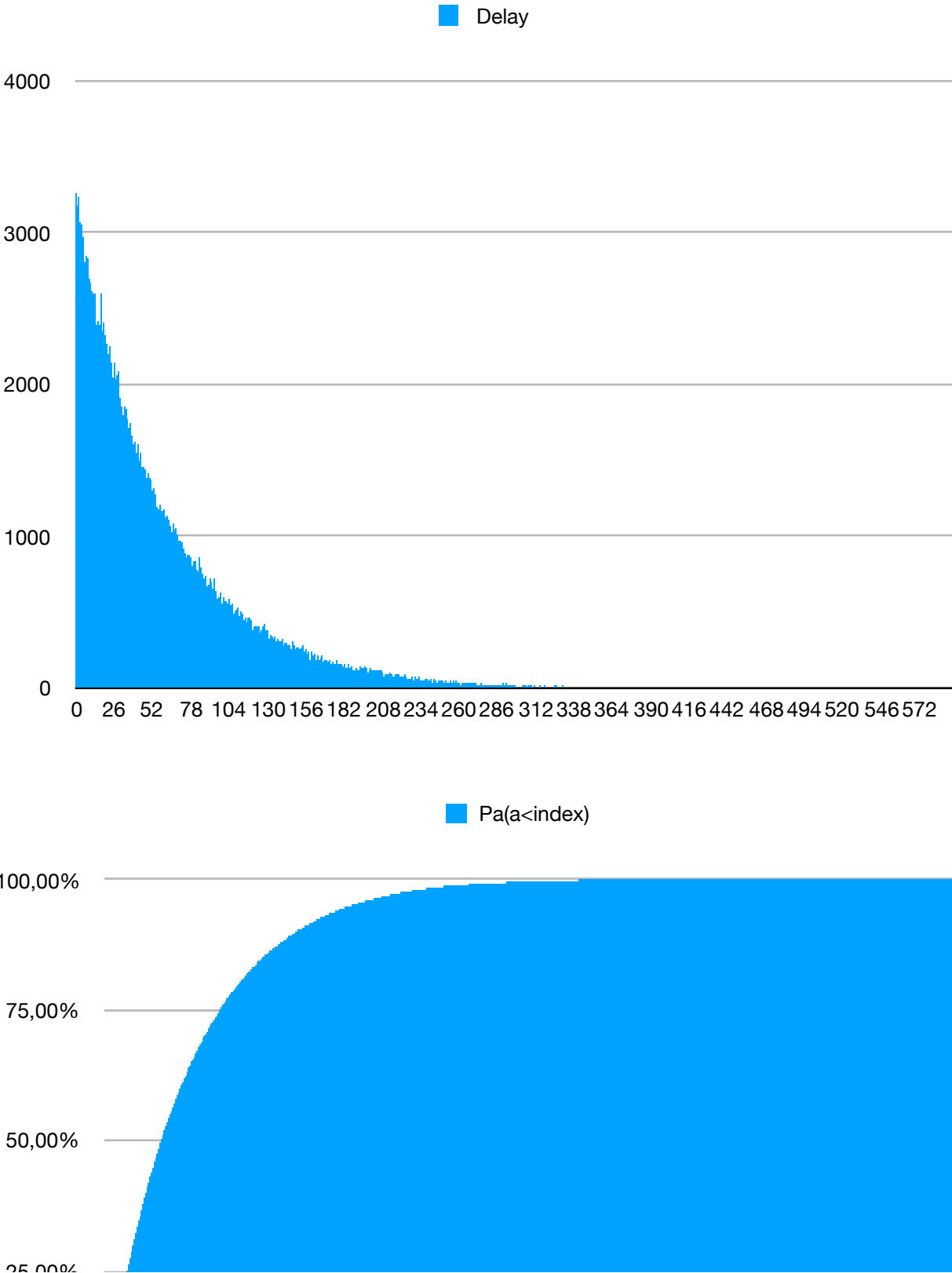
52	1296	59,27%	113284
53	1310	59,96%	114594
54	1271	60,62%	115865
55	1188	61,24%	117053
56	1182	61,86%	118235
57	1203	62,49%	119438
58	1167	63,10%	120605
59	1170	63,71%	121775
60	1177	64,33%	122952
61	1117	64,91%	124069
62	1137	65,51%	125206
63	1105	66,09%	126311
64	1067	66,65%	127378
65	1030	67,18%	128408
66	1077	67,75%	129485
67	1043	68,29%	130528
68	1056	68,85%	131584
69	1009	69,37%	132593
70	974	69,88%	133567
71	968	70,39%	134535
72	959	70,89%	135494
73	918	71,37%	136412
74	890	71,84%	137302
75	857	72,29%	138159
76	876	72,74%	139035
77	873	73,20%	139908
78	867	73,65%	140775
79	809	74,08%	141584
80	834	74,51%	142418
81	835	74,95%	143253
82	774	75,36%	144027
83	758	75,75%	144785
84	855	76,20%	145640
85	789	76,61%	146429
86	753	77,01%	147182
87	719	77,38%	147901
88	741	77,77%	148642
89	675	78,12%	149317
90	680	78,48%	149997
91	727	78,86%	150724
92	690	79,22%	151414
93	660	79,57%	152074
94	724	79,94%	152798
95	644	80,28%	153442
96	583	80,59%	154025
97	597	80,90%	154622
98	621	81,22%	155243
99	558	81,52%	155801
100	598	81,83%	156399
101	577	82,13%	156976
102	577	82,43%	157553
103	560	82,73%	158113
104	584	83,03%	158697
105	539	83,31%	159236

2

106	562	83,61%	159798
107	493	83,87%	160291
108	502	84,13%	160793
109	523	84,40%	161316
110	525	84,68%	161841
111	473	84,92%	162314
112	504	85,19%	162818
113	490	85,44%	163308
114	441	85,67%	163749
115	460	85,92%	164209
116	432	86,14%	164641
117	461	86,38%	165102
118	462	86,62%	165564
119	453	86,86%	166017
120	381	87,06%	166398
121	409	87,27%	166807
122	404	87,49%	167211
123	404	87,70%	167615
124	400	87,91%	168015
125	371	88,10%	168386
126	385	88,30%	168771
127	404	88,51%	169175
128	417	88,73%	169592
129	375	88,93%	169967
130	381	89,13%	170348
131	329	89,30%	170677
132	350	89,48%	171027
133	338	89,66%	171365
134	328	89,83%	171693
135	343	90,01%	172036
136	316	90,18%	172352
137	323	90,34%	172675
138	314	90,51%	172989
139	309	90,67%	173298
140	317	90,84%	173615
141	279	90,98%	173894
142	291	91,13%	174185
143	301	91,29%	174486
144	280	91,44%	174766
145	281	91,59%	175047
146	254	91,72%	175301
147	311	91,88%	175612
148	286	92,03%	175898
149	259	92,17%	176157
150	272	92,31%	176429
151	273	92,45%	176702
152	261	92,59%	176963
153	264	92,73%	177227
154	279	92,87%	177506
155	246	93,00%	177752
156	254	93,13%	178006
157	224	93,25%	178230
158	246	93,38%	178476
159	188	93,48%	178664

160	241	93,60%	178905
161	215	93,72%	179120
162	233	93,84%	179353
163	191	93,94%	179544
164	215	94,05%	179759
165	189	94,15%	179948
166	195	94,25%	180143
167	212	94,36%	180355
168	178	94,46%	180533
169	192	94,56%	180725
170	189	94,66%	180914
171	174	94,75%	181088
172	190	94,85%	181278
173	154	94,93%	181432
174	167	95,01%	181599
175	160	95,10%	181759
176	156	95,18%	181915
177	182	95,27%	182097
178	159	95,36%	182256
179	157	95,44%	182413
180	157	95,52%	182570
181	151	95,60%	182721
182	153	95,68%	182874
183	133	95,75%	183007
184	125	95,82%	183132
185	162	95,90%	183294
186	125	95,97%	183419
187	151	96,05%	183570
188	114	96,10%	183684
189	114	96,16%	183798
190	132	96,23%	183930
191	121	96,30%	184051
192	118	96,36%	184169
193	143	96,43%	184312
194	131	96,50%	184443
195	135	96,57%	184578
196	141	96,65%	184719
197	124	96,71%	184843
198	109	96,77%	184952
199	117	96,83%	185069
200	131	96,90%	185200
201	112	96,96%	185312
202	119	97,02%	185431
203	111	97,08%	185542
204	113	97,14%	185655
205	120	97,20%	185775
206	115	97,26%	185890
207	113	97,32%	186003
208	99	97,37%	186102
209	72	97,41%	186174
210	96	97,46%	186270
211	96	97,51%	186366
212	85	97,55%	186451
213	100	97,60%	186551

214	90	97,65%	186641
215	82	97,69%	186723
216	79	97,74%	186802
217	87	97,78%	186889
218	95	97,83%	186984
219	86	97,88%	187070
220	75	97,92%	187145
221	78	97,96%	187223
222	74	98,00%	187297
223	88	98,04%	187385
224	74	98,08%	187459
225	68	98,12%	187527
226	65	98,15%	187592
227	66	98,18%	187658
228	79	98,23%	187737
229	46	98,25%	187783
230	72	98,29%	187855
231	67	98,32%	187922
232	68	98,36%	187990
233	70	98,39%	188060
234	45	98,42%	188105
235	48	98,44%	188153
236	51	98,47%	188204
237	58	98,50%	188262
238	61	98,53%	188323
239	46	98,56%	188369
240	51	98,58%	188420
241	58	98,61%	188478
242	35	98,63%	188513
243	59	98,66%	188572
244	45	98,69%	188617
245	40	98,71%	188657
246	44	98,73%	188701
247	49	98,76%	188750
248	48	98,78%	188798
249	43	98,80%	188841
250	35	98,82%	188876
251	44	98,84%	188920
252	35	98,86%	188955
253	36	98,88%	188991
254	42	98,90%	189033
255	39	98,92%	189072
256	48	98,95%	189120
257	28	98,96%	189148
258	44	98,99%	189192
259	38	99,01%	189230
260	32	99,02%	189262
261	23	99,04%	189285
262	29	99,05%	189314
263	32	99,07%	189346
264	28	99,08%	189374
265	30	99,10%	189404
266	32	99,11%	189436
267	39	99,13%	189475

268	33	99,15%	189508
269	31	99,17%	189539
270	32	99,18%	189571
271	28	99,20%	189599
272	25	99,21%	189624
273	20	99,22%	189644
274	26	99,24%	189670
275	28	99,25%	189698
276	21	99,26%	189719
277	26	99,28%	189745
278	26	99,29%	189771
279	15	99,30%	189786
280	24	99,31%	189810
281	21	99,32%	189831
282	22	99,33%	189853
283	19	99,34%	189872
284	17	99,35%	189889
285	25	99,36%	189914
286	23	99,38%	189937
287	23	99,39%	189960
288	25	99,40%	189985
289	21	99,41%	190006
290	28	99,43%	190034
291	21	99,44%	190055
292	29	99,45%	190084
293	20	99,46%	190104
294	14	99,47%	190118
295	14	99,48%	190132
296	15	99,49%	190147
297	17	99,50%	190164
298	20	99,51%	190184
299	12	99,51%	190196
300	9	99,52%	190205
301	8	99,52%	190213
302	13	99,53%	190226
303	22	99,54%	190248
304	21	99,55%	190269
305	14	99,56%	190283
306	13	99,56%	190296
307	20	99,57%	190316
308	14	99,58%	190330
309	16	99,59%	190346
310	9	99,60%	190355
311	18	99,60%	190373
312	13	99,61%	190386
313	12	99,62%	190398
314	13	99,62%	190411
315	14	99,63%	190425
316	13	99,64%	190438
317	10	99,64%	190448
318	16	99,65%	190464
319	9	99,66%	190473
320	12	99,66%	190485
321	4	99,67%	190489

322	7	99,67%	190496
323	12	99,68%	190508
324	9	99,68%	190517
325	15	99,69%	190532
326	17	99,70%	190549
327	8	99,70%	190557
328	6	99,70%	190563
329	10	99,71%	190573
330	14	99,72%	190587
331	8	99,72%	190595
332	13	99,73%	190608
333	9	99,73%	190617
334	5	99,73%	190622
335	9	99,74%	190631
336	6	99,74%	190637
337	9	99,75%	190646
338	7	99,75%	190653
339	9	99,76%	190662
340	10	99,76%	190672
341	9	99,77%	190681
342	9	99,77%	190690
343	6	99,77%	190696
344	6	99,78%	190702
345	8	99,78%	190710
346	7	99,78%	190717
347	5	99,79%	190722
348	6	99,79%	190728
349	6	99,79%	190734
350	5	99,80%	190739
351	11	99,80%	190750
352	4	99,80%	190754
353	4	99,81%	190758
354	5	99,81%	190763
355	10	99,81%	190773
356	6	99,82%	190779
357	3	99,82%	190782
358	6	99,82%	190788
359	7	99,83%	190795
360	6	99,83%	190801
361	2	99,83%	190803
362	7	99,83%	190810
363	5	99,84%	190815
364	5	99,84%	190820
365	3	99,84%	190823
366	6	99,84%	190829
367	8	99,85%	190837
368	3	99,85%	190840
369	7	99,85%	190847
370	2	99,85%	190849
371	8	99,86%	190857
372	1	99,86%	190858
373	6	99,86%	190864
374	2	99,86%	190866
375	3	99,86%	190869

376	3	99,87%	190872
377	4	99,87%	190876
378	5	99,87%	190881
379	6	99,87%	190887
380	5	99,88%	190892
381	1	99,88%	190893
382	7	99,88%	190900
383	3	99,88%	190903
384	1	99,88%	190904
385	4	99,88%	190908
386	5	99,89%	190913
387	2	99,89%	190915
388	3	99,89%	190918
389	4	99,89%	190922
390	3	99,89%	190925
391	5	99,90%	190930
392	5	99,90%	190935
393	7	99,90%	190942
394	6	99,91%	190948
395	1	99,91%	190949
396	2	99,91%	190951
397	5	99,91%	190956
398	3	99,91%	190959
399	2	99,91%	190961
400	2	99,91%	190963
401	2	99,91%	190965
402	2	99,92%	190967
403	2	99,92%	190969
404	2	99,92%	190971
405	5	99,92%	190976
406	2	99,92%	190978
407	2	99,92%	190980
408	4	99,92%	190984
409	4	99,93%	190988
410	2	99,93%	190990
411	1	99,93%	190991
412	3	99,93%	190994
413	2	99,93%	190996
414	1	99,93%	190997
415	3	99,93%	191000
416	1	99,93%	191001
417	3	99,93%	191004
418	0	99,93%	191004
419	2	99,94%	191006
420	2	99,94%	191008
421	3	99,94%	191011
422	3	99,94%	191014
423	3	99,94%	191017
424	1	99,94%	191018
425	0	99,94%	191018
426	3	99,94%	191021
427	2	99,94%	191023
428	3	99,95%	191026
429	1	99,95%	191027

430	1	99,95%	191028
431	1	99,95%	191029
432	2	99,95%	191031
433	1	99,95%	191032
434	4	99,95%	191036
435	1	99,95%	191037
436	0	99,95%	191037
437	2	99,95%	191039
438	1	99,95%	191040
439	2	99,95%	191042
440	0	99,95%	191042
441	0	99,95%	191042
442	0	99,95%	191042
443	3	99,96%	191045
444	1	99,96%	191046
445	0	99,96%	191046
446	2	99,96%	191048
447	0	99,96%	191048
448	1	99,96%	191049
449	2	99,96%	191051
450	2	99,96%	191053
451	2	99,96%	191055
452	0	99,96%	191055
453	2	99,96%	191057
454	0	99,96%	191057
455	0	99,96%	191057
456	0	99,96%	191057
457	1	99,96%	191058
458	0	99,96%	191058
459	2	99,96%	191060
460	1	99,96%	191061
461	0	99,96%	191061
462	0	99,96%	191061
463	1	99,96%	191062
464	0	99,96%	191062
465	1	99,97%	191063
466	0	99,97%	191063
467	1	99,97%	191064
468	1	99,97%	191065
469	1	99,97%	191066
470	1	99,97%	191067
471	0	99,97%	191067
472	0	99,97%	191067
473	1	99,97%	191068
474	0	99,97%	191068
475	1	99,97%	191069
476	0	99,97%	191069
477	3	99,97%	191072
478	0	99,97%	191072
479	0	99,97%	191072
480	0	99,97%	191072
481	0	99,97%	191072
482	0	99,97%	191072
483	0	99,97%	191072

9

484	1	99,97%	191073
485	2	99,97%	191075
486	2	99,97%	191077
487	0	99,97%	191077
488	0	99,97%	191077
489	0	99,97%	191077
490	1	99,97%	191078
491	1	99,97%	191079
492	1	99,97%	191080
493	0	99,97%	191080
494	1	99,97%	191081
495	1	99,98%	191082
496	2	99,98%	191084
497	1	99,98%	191085
498	1	99,98%	191086
499	2	99,98%	191088
500	0	99,98%	191088
501	0	99,98%	191088
502	0	99,98%	191088
503	2	99,98%	191090
504	1	99,98%	191091
505	1	99,98%	191092
506	0	99,98%	191092
507	0	99,98%	191092
508	0	99,98%	191092
509	0	99,98%	191092
510	1	99,98%	191093
511	0	99,98%	191093
512	1	99,98%	191094
513	1	99,98%	191095
514	1	99,98%	191096
515	0	99,98%	191096
516	1	99,98%	191097
517	1	99,98%	191098
518	0	99,98%	191098
519	0	99,98%	191098
520	0	99,98%	191098
521	0	99,98%	191098
522	0	99,98%	191098
523	0	99,98%	191098
524	5	99,99%	191103
525	0	99,99%	191103
526	1	99,99%	191104
527	0	99,99%	191104
528	0	99,99%	191104
529	1	99,99%	191105
530	1	99,99%	191106
531	0	99,99%	191106
532	0	99,99%	191106
533	1	99,99%	191107
534	0	99,99%	191107
535	2	99,99%	191109
536	0	99,99%	191109
537	0	99,99%	191109

538	0	99,99%	191109
539	0	99,99%	191109
540	0	99,99%	191109
541	0	99,99%	191109
542	1	99,99%	191110
543	1	99,99%	191111
544	0	99,99%	191111
545	0	99,99%	191111
546	0	99,99%	191111
547	1	99,99%	191112
548	1	99,99%	191113
549	0	99,99%	191113
550	0	99,99%	191113
551	0	99,99%	191113
552	0	99,99%	191113
553	0	99,99%	191113
554	0	99,99%	191113
555	1	99,99%	191114
556	0	99,99%	191114
557	0	99,99%	191114
558	0	99,99%	191114
559	0	99,99%	191114
560	0	99,99%	191114
561	0	99,99%	191114
562	1	99,99%	191115
563	1	99,99%	191116
564	0	99,99%	191116
565	0	99,99%	191116
566	0	99,99%	191116
567	1	99,99%	191117
568	2	99,99%	191119
569	0	99,99%	191119
570	0	99,99%	191119
571	1	100,00%	191120
572	2	100,00%	191122
573	0	100,00%	191122
574	0	100,00%	191122
575	0	100,00%	191122
576	0	100,00%	191122
577	1	100,00%	191123
578	2	100,00%	191125
579	0	100,00%	191125
580	0	100,00%	191125
581	0	100,00%	191125
582	0	100,00%	191125
583	0	100,00%	191125
584	2	100,00%	191127
585	0	100,00%	191127
586	0	100,00%	191127
587	1	100,00%	191128
588	0	100,00%	191128
589	0	100,00%	191128
590	0	100,00%	191128
591	0	100,00%	191128

592	0	100,00%	191128
593	0	100,00%	191128
594	1	100,00%	191129

Erlang-B

Index	Delay	Pa(a<index)	Sum Delays
0	5196	2,42%	5196
1	5166	4,83%	10362
2	5082	7,19%	15444
3	4904	9,48%	20348
4	4954	11,78%	25302
5	4809	14,02%	30111
6	4677	16,20%	34788
7	4540	18,31%	39328
8	4461	20,39%	43789
9	4379	22,43%	48168
10	4234	24,40%	52402
11	4260	26,38%	56662
12	4287	28,38%	60949
13	4205	30,34%	65154
14	4156	32,27%	69310
15	4096	34,18%	73406
16	3871	35,98%	77277
17	3818	37,76%	81095
18	3790	39,53%	84885
19	3788	41,29%	88673
20	3612	42,97%	92285
21	3515	44,61%	95800
22	3524	46,25%	99324
23	3413	47,84%	102737
24	3291	49,37%	106028
25	3249	50,89%	109277
26	3243	52,40%	112520
27	3121	53,85%	115641
28	3125	55,30%	118766
29	3045	56,72%	121811
30	2905	58,07%	124716
31	2901	59,43%	127617
32	2814	60,74%	130431
33	2767	62,02%	133198
34	2727	63,29%	135925
35	2658	64,53%	138583
36	2544	65,72%	141127
37	2493	66,88%	143620
38	2333	67,96%	145953
39	2360	69,06%	148313
40	2251	70,11%	150564
41	2216	71,14%	152780
42	2096	72,12%	154876
43	2043	73,07%	156919
44	1973	73,99%	158892
45	1942	74,89%	160834
46	1862	75,76%	162696
47	1936	76,66%	164632
48	1801	77,50%	166433
49	1791	78,33%	168224
50	1683	79,12%	169907
51	1606	79,87%	171513

Enunciado

Valores Definidos	Erlang-B		
	1 a)	1 b)	1 c)
m (channels)	8	8	8
l (arrival rate/hour)	0,009	0,009	0,009
lambda (calls/hour)	180	180	180
dm (min)	2	2	2
L (buffer size)	0	1 000	4
K (population size)	20 000	20 000	20 000

Resultados

Valores Definidos	Erlang-B		
	1 a)	1 b)	1 c)
B	12%	0%	3,1%
P(A>0)	0%	35,7%	26,8%
Am (sec)	0	21,041	8,674

Delay

Pa(a<index) in 1b) — Pa(a<index) in 1c)

1
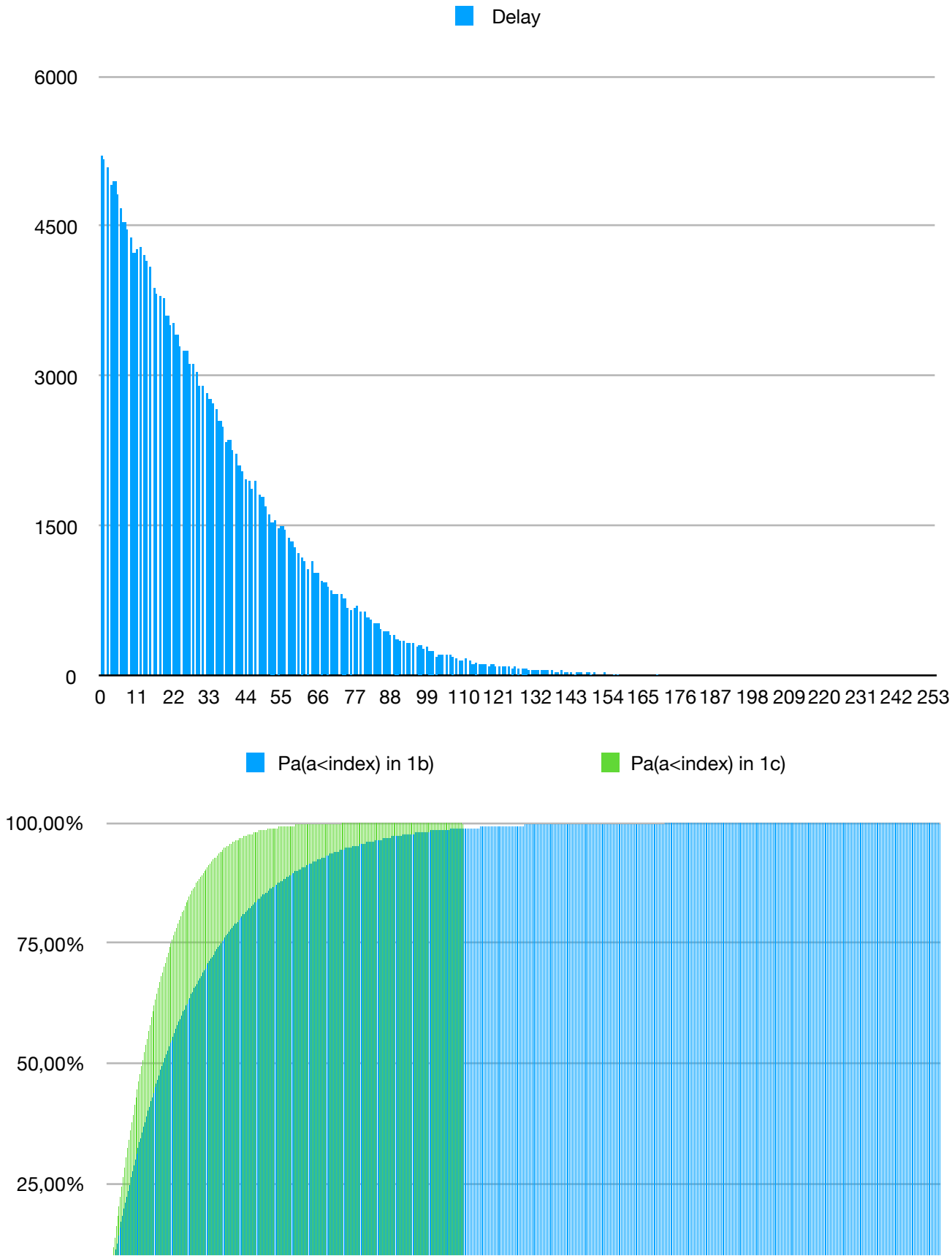
52	1541	80,58%	173054
53	1556	81,31%	174610
54	1481	82,00%	176091
55	1494	82,69%	177585
56	1454	83,37%	179039
57	1386	84,02%	180425
58	1336	84,64%	181761
59	1291	85,24%	183052
60	1227	85,81%	184279
61	1191	86,37%	185470
62	1143	86,90%	186613
63	1065	87,39%	187678
64	1142	87,93%	188820
65	1021	88,40%	189841
66	1024	88,88%	190865
67	958	89,32%	191823
68	923	89,75%	192746
69	899	90,17%	193645
70	846	90,57%	194491
71	821	90,95%	195312
72	814	91,33%	196126
73	810	91,70%	196936
74	773	92,06%	197709
75	677	92,38%	198386
76	650	92,68%	199036
77	677	93,00%	199713
78	695	93,32%	200408
79	634	93,62%	201042
80	642	93,92%	201684
81	579	94,18%	202263
82	554	94,44%	202817
83	531	94,69%	203348
84	515	94,93%	203863
85	463	95,15%	204326
86	453	95,36%	204779
87	451	95,57%	205230
88	407	95,76%	205637
89	404	95,94%	206041
90	361	96,11%	206402
91	355	96,28%	206757
92	345	96,44%	207102
93	335	96,59%	207437
94	323	96,74%	207760
95	321	96,89%	208081
96	289	97,03%	208370
97	299	97,17%	208669
98	269	97,29%	208938
99	279	97,42%	209217
100	241	97,54%	209458
101	251	97,65%	209709
102	191	97,74%	209900
103	218	97,84%	210118
104	218	97,94%	210336
105	206	98,04%	210542
106	209	98,14%	210751

0,00%

0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575
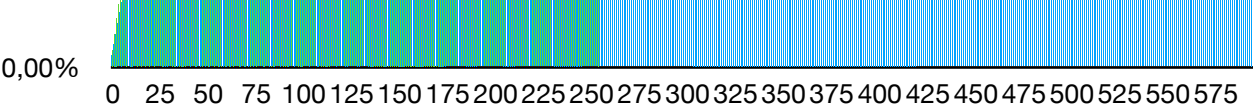
107	200	98,23%	210951
108	180	98,31%	211131
109	159	98,39%	211290
110	159	98,46%	211449
111	170	98,54%	211619
112	143	98,61%	211762
113	119	98,66%	211881
114	127	98,72%	212008
115	121	98,78%	212129
116	116	98,83%	212245
117	120	98,89%	212365
118	95	98,93%	212460
119	120	98,99%	212580
120	92	99,03%	212672
121	101	99,08%	212773
122	89	99,12%	212862
123	94	99,16%	212956
124	92	99,21%	213048
125	72	99,24%	213120
126	95	99,28%	213215
127	77	99,32%	213292
128	81	99,36%	213373
129	66	99,39%	213439
130	51	99,41%	213490
131	62	99,44%	213552
132	63	99,47%	213615
133	55	99,50%	213670
134	59	99,52%	213729
135	52	99,55%	213781
136	46	99,57%	213827
137	54	99,59%	213881
138	31	99,61%	213912
139	40	99,63%	213952
140	48	99,65%	214000
141	42	99,67%	214042
142	43	99,69%	214085
143	41	99,71%	214126
144	23	99,72%	214149
145	27	99,73%	214176
146	33	99,75%	214209
147	18	99,76%	214227
148	25	99,77%	214252
149	24	99,78%	214276
150	25	99,79%	214301
151	19	99,80%	214320
152	19	99,81%	214339
153	28	99,82%	214367
154	18	99,83%	214385
155	15	99,84%	214400
156	24	99,85%	214424
157	22	99,86%	214446
158	17	99,87%	214463
159	8	99,87%	214471
160	10	99,87%	214481
161	16	99,88%	214497

162	15	99,89%	214512
163	9	99,89%	214521
164	10	99,90%	214531
165	12	99,90%	214543
166	12	99,91%	214555
167	6	99,91%	214561
168	10	99,92%	214571
169	20	99,93%	214591
170	9	99,93%	214600
171	5	99,93%	214605
172	7	99,94%	214612
173	8	99,94%	214620
174	6	99,94%	214626
175	13	99,95%	214639
176	4	99,95%	214643
177	5	99,95%	214648
178	6	99,95%	214654
179	3	99,96%	214657
180	7	99,96%	214664
181	3	99,96%	214667
182	5	99,96%	214672
183	4	99,97%	214676
184	2	99,97%	214678
185	4	99,97%	214682
186	5	99,97%	214687
187	2	99,97%	214689
188	1	99,97%	214690
189	3	99,97%	214693
190	6	99,98%	214699
191	4	99,98%	214703
192	5	99,98%	214708
193	1	99,98%	214709
194	4	99,98%	214713
195	2	99,98%	214715
196	1	99,98%	214716
197	2	99,98%	214718
198	4	99,99%	214722
199	2	99,99%	214724
200	1	99,99%	214725
201	1	99,99%	214726
202	0	99,99%	214726
203	2	99,99%	214728
204	0	99,99%	214728
205	0	99,99%	214728
206	1	99,99%	214729
207	0	99,99%	214729
208	0	99,99%	214729
209	0	99,99%	214729
210	3	99,99%	214732
211	2	99,99%	214734
212	2	99,99%	214736
213	1	99,99%	214737
214	1	99,99%	214738
215	0	99,99%	214738
216	2	99,99%	214740

217	0	99,99%	214740
218	1	100,00%	214741
219	0	100,00%	214741
220	0	100,00%	214741
221	0	100,00%	214741
222	1	100,00%	214742
223	1	100,00%	214743
224	1	100,00%	214744
225	0	100,00%	214744
226	0	100,00%	214744
227	2	100,00%	214746
228	0	100,00%	214746
229	0	100,00%	214746
230	1	100,00%	214747
231	2	100,00%	214749
232	1	100,00%	214750
233	0	100,00%	214750
234	0	100,00%	214750
235	0	100,00%	214750
236	0	100,00%	214750
237	0	100,00%	214750
238	0	100,00%	214750
239	0	100,00%	214750
240	0	100,00%	214750
241	0	100,00%	214750
242	0	100,00%	214750
243	0	100,00%	214750
244	0	100,00%	214750
245	0	100,00%	214750
246	0	100,00%	214750
247	0	100,00%	214750
248	0	100,00%	214750
249	0	100,00%	214750
250	0	100,00%	214750
251	0	100,00%	214750
252	0	100,00%	214750
253	1	100,00%	214751

Erlang-C

Enunciado				
Valores Definidos	**Erlang-B**			**Erlang-C**
	1 a)	**1 b)**	**1 c)**	**2 a)**
m (channels)	8	8	8	64
l (arrival rate/hour)	0,009	0,009	0,009	0,06
lambda (calls/hour)	180	180	180	1 200
dm (min)	2	2	2	3
L (buffer size)	0	1 000	4	0
K (population size)	20 000	20 000	20 000	20 000

Resultados				
Valores Definidos	**Erlang-B**			**Erlang-C**
	1 a)	**1 b)**	**1 c)**	**2 a)**
B	12%	0%	3,1%	5,9%
P(A>0)	0%	35,7%	26,8%	0%
Am (sec)	0	21,041	8,674	0

Erlang-C

Index	Delay	Pa(a<index)	Sum Delays
0	7861	2,39%	7861
1	7484	4,66%	15345
2	7530	6,95%	22875
3	7258	9,16%	30133
4	7042	11,30%	37175
5	6910	13,40%	44085
6	6601	15,41%	50686
7	6479	17,38%	57165
8	6376	19,32%	63541
9	6226	21,21%	69767
10	5948	23,02%	75715
11	5996	24,84%	81711
12	5817	26,61%	87528
13	5498	28,28%	93026
14	5630	29,99%	98656
15	5355	31,62%	104011
16	5218	33,21%	109229
17	5026	34,73%	114255
18	5039	36,26%	119294
19	5007	37,79%	124301
20	4801	39,25%	129102
21	4780	40,70%	133882
22	4524	42,07%	138406
23	4573	43,46%	142979
24	4393	44,80%	147372
25	4298	46,11%	151670
26	4167	47,37%	155837
27	4137	48,63%	159974
28	3992	49,84%	163966
29	3880	51,02%	167846
30	3844	52,19%	171690
31	3595	53,29%	175285
32	3636	54,39%	178921
33	3532	55,46%	182453
34	3454	56,51%	185907
35	3345	57,53%	189252
36	3293	58,53%	192545
37	3231	59,51%	195776
38	3091	60,45%	198867
39	3085	61,39%	201952
40	2953	62,29%	204905
41	2960	63,19%	207865
42	2860	64,06%	210725
43	2778	64,90%	213503
44	2690	65,72%	216193
45	2653	66,53%	218846
46	2634	67,33%	221480
47	2577	68,11%	224057
48	2599	68,90%	226656
49	2522	69,67%	229178
50	2513	70,43%	231691
51	2237	71,11%	233928

Enunciado

Valores Definidos	Erlang-B			Erlang-C	
	1 a)	1 b)	1 c)	2 a)	2 b)
m (channels)	8	8	8	64	64
l (arrival rate/hour)	0,009	0,009	0,009	0,06	0,06
lambda (calls/hour)	180	180	180	1 200	1 200
dm (min)	2	2	2	3	3
L (buffer size)	0	1 000	4	0	1 000
K (population size)	20 000	20 000	20 000	20 000	20 000

Resultados

Valores Definidos	Erlang-B			Erlang-C	
	1 a)	1 b)	1 c)	2 a)	2 b)
B	12%	0%	3,1%	5,9%	0%
P(A>0)	0%	35,7%	26,8%	0%	48,6%
Am (sec)	0	21,041	8,674	0	20,079

Delay

Pa(a<index)

1
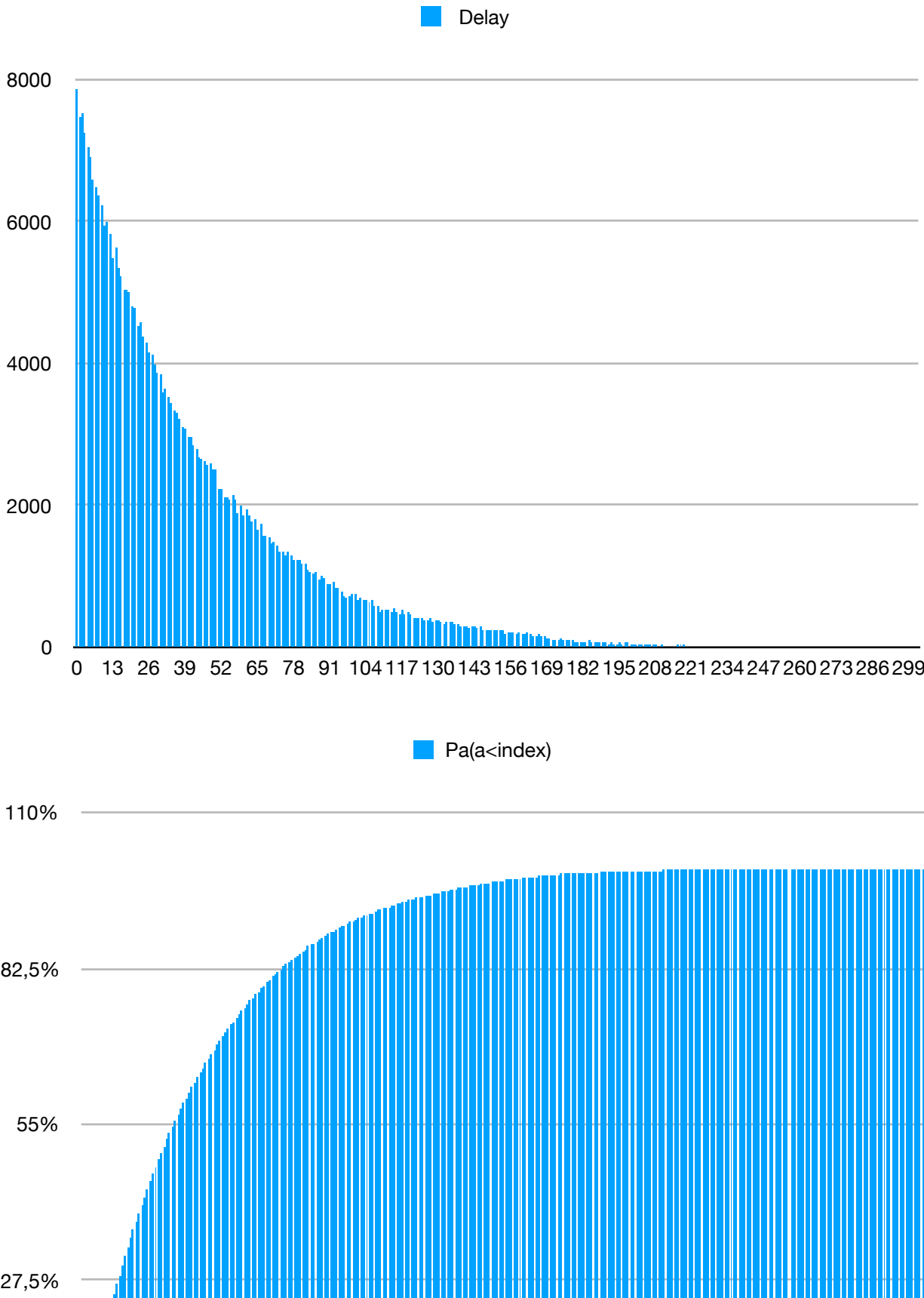
52	2233	71,79%	236161
53	2123	72,44%	238284
54	2114	73,08%	240398
55	2085	73,71%	242483
56	2133	74,36%	244616
57	2095	75,00%	246711
58	1884	75,57%	248595
59	1986	76,18%	250581
60	1854	76,74%	252435
61	1927	77,32%	254362
62	1867	77,89%	256229
63	1778	78,43%	258007
64	1796	78,98%	259803
65	1671	79,49%	261474
66	1729	80,01%	263203
67	1578	80,49%	264781
68	1579	80,97%	266360
69	1545	81,44%	267905
70	1453	81,88%	269358
71	1484	82,33%	270842
72	1442	82,77%	272284
73	1354	83,18%	273638
74	1346	83,59%	274984
75	1286	83,98%	276270
76	1340	84,39%	277610
77	1295	84,79%	278905
78	1227	85,16%	280132
79	1234	85,53%	281366
80	1224	85,91%	282590
81	1178	86,26%	283768
82	1179	86,62%	284947
83	1095	86,96%	286042
84	1058	87,28%	287100
85	1046	87,59%	288146
86	1063	87,92%	289209
87	943	88,20%	290152
88	995	88,51%	291147
89	987	88,81%	292134
90	897	89,08%	293031
91	895	89,35%	293926
92	914	89,63%	294840
93	833	89,88%	295673
94	835	90,14%	296508
95	771	90,37%	297279
96	724	90,59%	298003
97	698	90,80%	298701
98	732	91,03%	299433
99	759	91,26%	300192
100	739	91,48%	300931
101	678	91,69%	301609
102	698	91,90%	302307
103	653	92,10%	302960
104	651	92,30%	303611
105	648	92,49%	304259

2
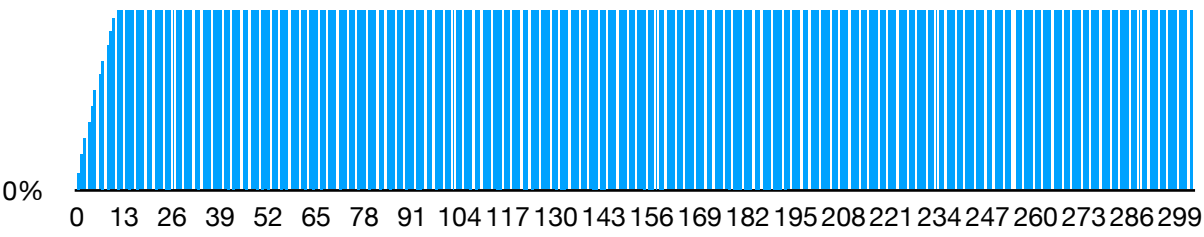
106	651	92,69%	304910
107	579	92,87%	305489
108	570	93,04%	306059
109	507	93,19%	306566
110	514	93,35%	307080
111	536	93,51%	307616
112	534	93,68%	308150
113	507	93,83%	308657
114	546	94,00%	309203
115	499	94,15%	309702
116	475	94,29%	310177
117	511	94,45%	310688
118	452	94,58%	311140
119	492	94,73%	311632
120	472	94,88%	312104
121	410	95,00%	312514
122	416	95,13%	312930
123	422	95,26%	313352
124	411	95,38%	313763
125	385	95,50%	314148
126	394	95,62%	314542
127	401	95,74%	314943
128	366	95,85%	315309
129	381	95,97%	315690
130	376	96,08%	316066
131	353	96,19%	316419
132	336	96,29%	316755
133	364	96,40%	317119
134	345	96,51%	317464
135	362	96,62%	317826
136	338	96,72%	318164
137	315	96,82%	318479
138	285	96,90%	318764
139	300	96,99%	319064
140	286	97,08%	319350
141	264	97,16%	319614
142	286	97,25%	319900
143	287	97,34%	320187
144	277	97,42%	320464
145	295	97,51%	320759
146	249	97,58%	321008
147	239	97,66%	321247
148	248	97,73%	321495
149	230	97,80%	321725
150	242	97,88%	321967
151	240	97,95%	322207
152	229	98,02%	322436
153	229	98,09%	322665
154	184	98,14%	322849
155	205	98,21%	323054
156	197	98,27%	323251
157	203	98,33%	323454
158	192	98,39%	323646
159	204	98,45%	323850

160	183	98,50%	324033
161	182	98,56%	324215
162	211	98,62%	324426
163	175	98,68%	324601
164	163	98,73%	324764
165	160	98,78%	324924
166	192	98,83%	325116
167	154	98,88%	325270
168	149	98,93%	325419
169	131	98,97%	325550
170	115	99,00%	325665
171	105	99,03%	325770
172	107	99,06%	325877
173	92	99,09%	325969
174	119	99,13%	326088
175	94	99,16%	326182
176	104	99,19%	326286
177	93	99,22%	326379
178	104	99,25%	326483
179	81	99,27%	326564
180	74	99,30%	326638
181	79	99,32%	326717
182	77	99,34%	326794
183	80	99,37%	326874
184	95	99,40%	326969
185	62	99,42%	327031
186	63	99,43%	327094
187	64	99,45%	327158
188	64	99,47%	327222
189	66	99,49%	327288
190	62	99,51%	327350
191	47	99,53%	327397
192	57	99,54%	327454
193	53	99,56%	327507
194	48	99,58%	327555
195	60	99,59%	327615
196	42	99,61%	327657
197	60	99,62%	327717
198	58	99,64%	327775
199	54	99,66%	327829
200	46	99,67%	327875
201	48	99,69%	327923
202	44	99,70%	327967
203	37	99,71%	328004
204	47	99,73%	328051
205	38	99,74%	328089
206	33	99,75%	328122
207	31	99,76%	328153
208	31	99,77%	328184
209	26	99,77%	328210
210	31	99,78%	328241
211	28	99,79%	328269
212	25	99,80%	328294
213	21	99,81%	328315

214	19	99,81%	328334
215	26	99,82%	328360
216	31	99,83%	328391
217	35	99,84%	328426
218	31	99,85%	328457
219	23	99,86%	328480
220	15	99,86%	328495
221	12	99,86%	328507
222	19	99,87%	328526
223	14	99,87%	328540
224	15	99,88%	328555
225	19	99,88%	328574
226	16	99,89%	328590
227	11	99,89%	328601
228	7	99,90%	328608
229	11	99,90%	328619
230	10	99,90%	328629
231	6	99,90%	328635
232	10	99,91%	328645
233	8	99,91%	328653
234	12	99,91%	328665
235	11	99,92%	328676
236	17	99,92%	328693
237	12	99,92%	328705
238	21	99,93%	328726
239	10	99,93%	328736
240	15	99,94%	328751
241	14	99,94%	328765
242	16	99,95%	328781
243	18	99,95%	328799
244	15	99,96%	328814
245	17	99,96%	328831
246	14	99,97%	328845
247	15	99,97%	328860
248	18	99,98%	328878
249	15	99,98%	328893
250	20	99,99%	328913
251	13	99,99%	328926
252	15	100,00%	328941
253	12	100,00%	328953
254	8	Pa(a<index)	328961
255	7	100,00%	328968
256	5	100,01%	328973
257	8	100,01%	328981
258	6	100,01%	328987
259	11	100,01%	328998
260	7	100,02%	329005
261	10	100,02%	329015
262	9	100,02%	329024
263	12	100,03%	329036
264	7	100,03%	329043
265	12	100,03%	329055
266	15	100,04%	329070
267	7	100,04%	329077

268	7	100,04%	329084
269	5	100,04%	329089
270	8	100,04%	329097
271	3	100,04%	329100
272	9	100,05%	329109
273	6	100,05%	329115
274	11	100,05%	329126
275	9	100,06%	329135
276	8	100,06%	329143
277	6	100,06%	329149
278	8	100,06%	329157
279	3	100,06%	329160
280	3	100,06%	329163
281	7	100,07%	329170
282	2	100,07%	329172
283	1	100,07%	329173
284	4	100,07%	329177
285	10	100,07%	329187
286	9	100,07%	329196
287	9	100,08%	329205
288	8	100,08%	329213
289	7	100,08%	329220
290	4	100,08%	329224
291	3	100,08%	329227
292	2	100,08%	329229
293	2	100,08%	329231
294	2	100,09%	329233
295	2	100,09%	329235
296	1	100,09%	329236
297	2	100,09%	329238
298	1	100,09%	329239
299	4	100,09%	329243
300	1	100,09%	329244
301	0	100,09%	329244
302	1	100,09%	329245

Erlang-C

Index	Delay	Pa(a<index)	Sum Delays
0	11537	4,74%	11537
1	11099	9,29%	22636
2	10839	13,74%	33475
3	10534	18,07%	44009
4	10386	22,33%	54395
5	9985	26,43%	64380
6	10097	30,57%	74477
7	9783	34,59%	84260
8	9661	38,55%	93921
9	9311	42,38%	103232
10	8972	46,06%	112204
11	8947	49,73%	121151
12	8644	53,28%	129795
13	8328	56,70%	138123
14	8028	59,99%	146151
15	7887	63,23%	154038
16	7488	66,31%	161526
17	7010	69,18%	168536
18	6672	71,92%	175208
19	6462	74,57%	181670
20	6083	77,07%	187753
21	5722	79,42%	193475
22	5296	81,59%	198771
23	4996	83,65%	203767
24	4588	85,53%	208355
25	4280	87,29%	212635
26	3810	88,85%	216445
27	3411	90,25%	219856
28	2991	91,48%	222847
29	2697	92,58%	225544
30	2377	93,56%	227921
31	2150	94,44%	230071
32	1917	95,23%	231988
33	1623	95,90%	233611
34	1407	96,47%	235018
35	1279	97,00%	236297
36	1087	97,44%	237384
37	961	97,84%	238345
38	807	98,17%	239152
39	733	98,47%	239885
40	602	98,72%	240487
41	512	98,93%	240999
42	417	99,10%	241416
43	346	99,24%	241762
44	311	99,37%	242073
45	278	99,48%	242351
46	222	99,57%	242573
47	182	99,65%	242755
48	149	99,71%	242904
49	116	99,76%	243020
50	89	99,79%	243109
51	97	99,83%	243206

Enunciado

Valores Definidos	Erlang-B			Erlang-C		
	1 a)	1 b)	1 c)	2 a)	2 b)	2 c)
m (channels)	8	8	8	64	64	64
l (arrival rate/hour)	0,009	0,009	0,009	0,06	0,06	0,06
lambda (calls/hour)	180	180	180	1 200	1 200	1 200
dm (min)	2	2	2	3	3	3
L (buffer size)	0	1 000	4	0	1 000	10
K (population size)	20 000	20 000	20 000	20 000	20 000	20 000

Resultados

Valores Definidos	Erlang-B			Erlang-C		
	1 a)	1 b)	1 c)	2 a)	2 b)	2 c)
B	12%	0%	3,1%	5,9%	0%	2%
P(A>0)	0%	35,7%	26,8%	0%	48,6%	31,2%
Am (sec)	0	21,041	8,674	0	20,079	4,286

Delay

Pa(a<index) in 2b   Pa(a<index) in 2c
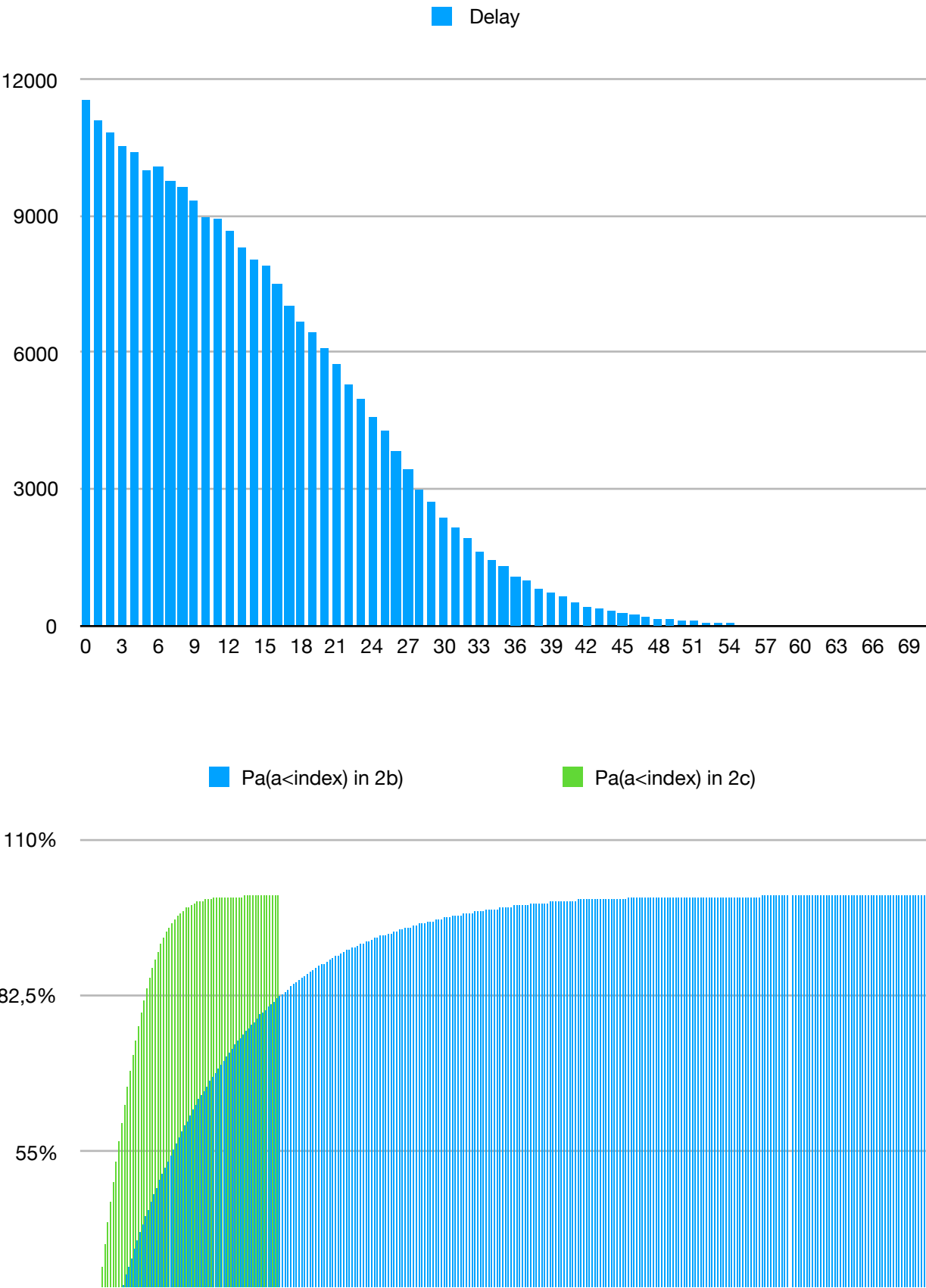
52	60	99,86%	243266
53	63	99,89%	243329
54	52	99,91%	243381
55	42	99,92%	243423
56	31	99,94%	243454
57	31	99,95%	243485
58	26	99,96%	243511
59	23	99,97%	243534
60	21	99,98%	243555
61	14	99,98%	243569
62	15	99,99%	243584
63	4	99,99%	243588
64	5	99,99%	243593
65	6	100,00%	243599
66	5	100,00%	243604
67	0	100,00%	243604
68	2	100,00%	243606
69	1	100,00%	243607
70	2	100,00%	243609
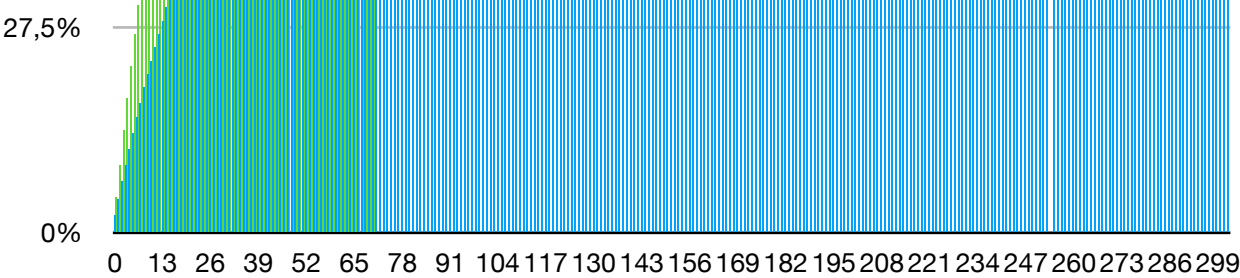
Engset

Index	Delay	Pa(a<index)	Sum Delays
0	6482	3,29%	6482
1	6374	6,52%	12856
2	6205	9,66%	19061
3	5927	12,66%	24988
4	5682	15,54%	30670
5	5512	18,34%	36182
6	5459	21,10%	41641
7	5199	23,74%	46840
8	5078	26,31%	51918
9	4899	28,79%	56817
10	4802	31,23%	61619
11	4734	33,63%	66353
12	4433	35,87%	70786
13	4430	38,12%	75216
14	4183	40,24%	79399
15	4050	42,29%	83449
16	4004	44,32%	87453
17	3818	46,26%	91271
18	3847	48,21%	95118
19	3555	50,01%	98673
20	3514	51,79%	102187
21	3524	53,57%	105711
22	3333	55,26%	109044
23	3249	56,91%	112293
24	3159	58,51%	115452
25	3018	60,04%	118470
26	2910	61,52%	121380
27	2730	62,90%	124110
28	2754	64,29%	126864
29	2583	65,60%	129447
30	2542	66,89%	131989
31	2511	68,16%	134500
32	2456	69,41%	136956
33	2238	70,54%	139194
34	2196	71,66%	141390
35	2128	72,74%	143518
36	2044	73,77%	145562
37	2004	74,79%	147566
38	1875	75,74%	149441
39	1847	76,67%	151288
40	1848	77,61%	153136
41	1648	78,44%	154784
42	1626	79,27%	156410
43	1592	80,08%	158002
44	1529	80,85%	159531
45	1499	81,61%	161030
46	1424	82,33%	162454
47	1381	83,03%	163835
48	1362	83,72%	165197
49	1237	84,35%	166434
50	1234	84,97%	167668
51	1253	85,61%	168921

Enunciado

Valores Definidos	Erlang-B			Erlang-C			Engset
	1 a)	1 b)	1 c)	2 a)	2 b)	2 c)	3
m (channels)	8	8	8	64	64	64	8
l (arrival rate/hour)	0,009	0,009	0,009	0,06	0,06	0,06	12
lambda (calls/hour)	180	180	180	1 200	2 400	1 200	240
dm (min)	2	2	2	3	3	3	2
L (buffer size)	0	1 000	4	0	1 000	10	4
K (population size)	20 000	20 000	20 000	20 000	20 000	20 000	20

Resultados

Valores Definidos	Erlang-B			Erlang-C			Engset
	1 a)	1 b)	1 c)	2 a)	2 b)	2 c)	3
B	12%	0%	3,1%	5,9%	0%	2%	0,514%
P(A>0)	0%	35,7%	26,8%	0%	48,6%	31,2%	16,9%
Am (sec)	0	21,041	8,674	0	20,079	4,286	4,551

Delay

Pa(a<index)

1
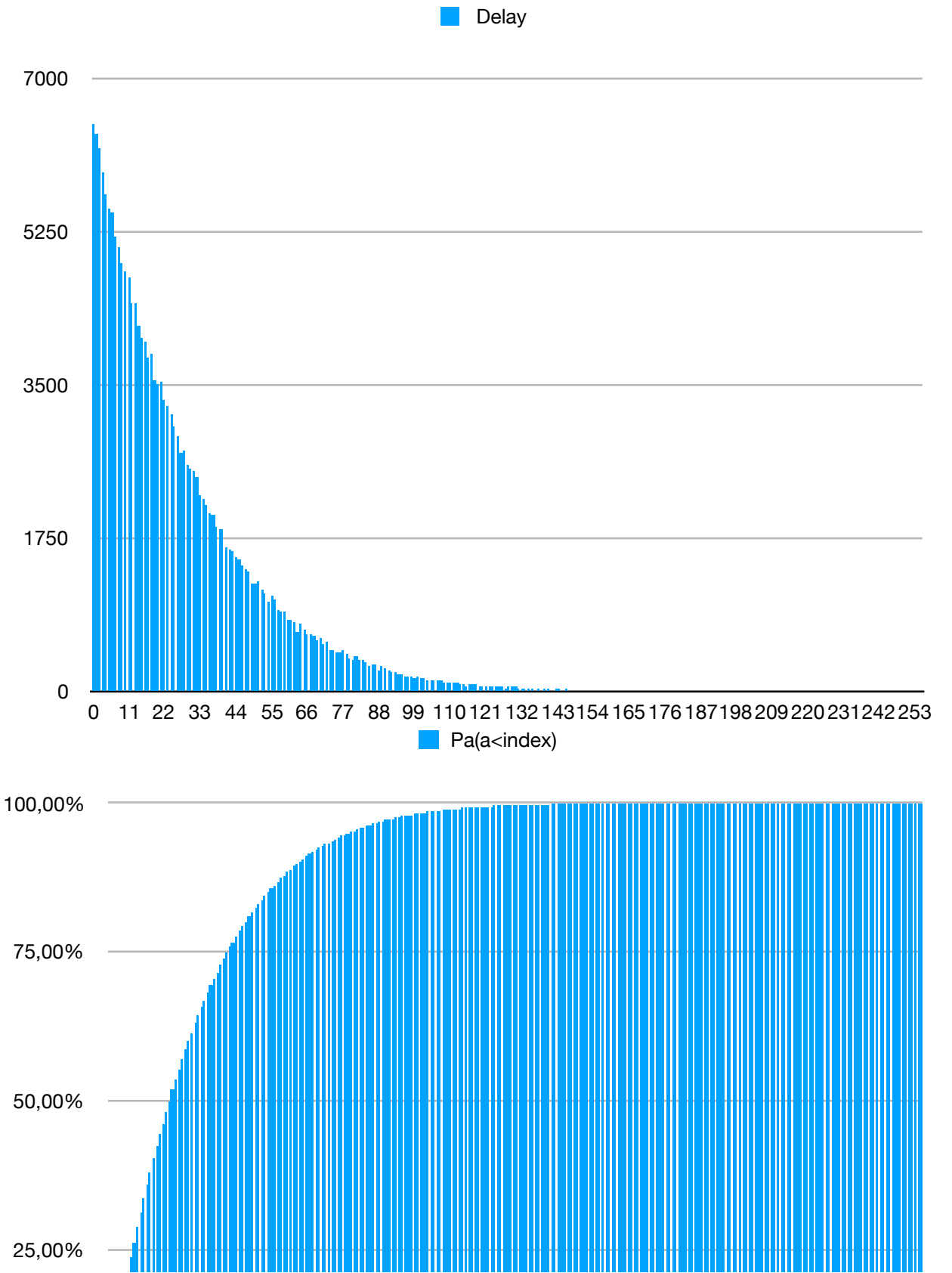
52	1164	86,20%	170085
53	1115	86,76%	171200
54	1028	87,29%	172228
55	1087	87,84%	173315
56	1047	88,37%	174362
57	924	88,84%	175286
58	895	89,29%	176181
59	898	89,74%	177079
60	810	90,15%	177889
61	818	90,57%	178707
62	785	90,97%	179492
63	684	91,31%	180176
64	763	91,70%	180939
65	706	92,06%	181645
66	649	92,39%	182294
67	651	92,72%	182945
68	616	93,03%	183561
69	576	93,32%	184137
70	605	93,63%	184742
71	533	93,90%	185275
72	561	94,18%	185836
73	476	94,42%	186312
74	474	94,66%	186786
75	439	94,89%	187225
76	454	95,12%	187679
77	466	95,35%	188145
78	414	95,56%	188559
79	385	95,76%	188944
80	350	95,93%	189294
81	389	96,13%	189683
82	350	96,31%	190033
83	361	96,49%	190394
84	326	96,66%	190720
85	293	96,81%	191013
86	309	96,96%	191322
87	302	97,12%	191624
88	243	97,24%	191867
89	272	97,38%	192139
90	248	97,50%	192387
91	225	97,62%	192612
92	224	97,73%	192836
93	211	97,84%	193047
94	198	97,94%	193245
95	181	98,03%	193426
96	166	98,11%	193592
97	168	98,20%	193760
98	156	98,28%	193916
99	139	98,35%	194055
100	166	98,43%	194221
101	150	98,51%	194371
102	150	98,58%	194521
103	117	98,64%	194638
104	125	98,71%	194763
105	117	98,77%	194880

0,00%

0 12 24 36 48 60 72 84 96 108 120 132 144 156 168 180 192 204 216 228 240 252
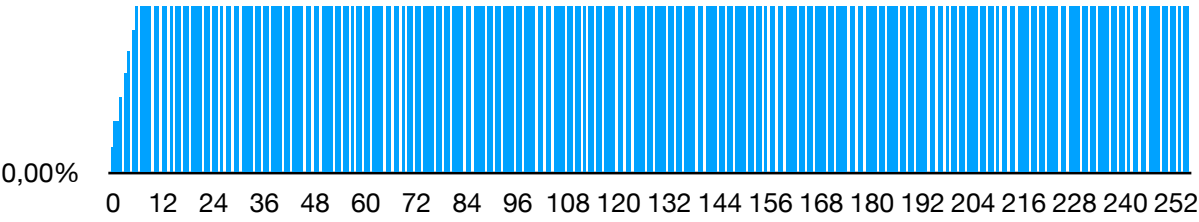
106	112	98,82%	194992
107	114	98,88%	195106
108	95	98,93%	195201
109	105	98,98%	195306
110	103	99,03%	195409
111	97	99,08%	195506
112	101	99,13%	195607
113	74	99,17%	195681
114	83	99,21%	195764
115	59	99,24%	195823
116	69	99,28%	195892
117	67	99,31%	195959
118	76	99,35%	196035
119	59	99,38%	196094
120	44	99,40%	196138
121	58	99,43%	196196
122	53	99,46%	196249
123	50	99,48%	196299
124	48	99,51%	196347
125	42	99,53%	196389
126	44	99,55%	196433
127	35	99,57%	196468
128	47	99,59%	196515
129	42	99,62%	196557
130	45	99,64%	196602
131	29	99,65%	196631
132	38	99,67%	196669
133	29	99,69%	196698
134	32	99,70%	196730
135	29	99,72%	196759
136	22	99,73%	196781
137	28	99,74%	196809
138	18	99,75%	196827
139	28	99,77%	196855
140	28	99,78%	196883
141	15	99,79%	196898
142	21	99,80%	196919
143	29	99,81%	196948
144	17	99,82%	196965
145	21	99,83%	196986
146	29	99,85%	197015
147	11	99,85%	197026
148	13	99,86%	197039
149	9	99,86%	197048
150	13	99,87%	197061
151	19	99,88%	197080
152	14	99,89%	197094
153	16	99,90%	197110
154	16	99,90%	197126
155	6	99,91%	197132
156	6	99,91%	197138
157	6	99,91%	197144
158	10	99,92%	197154
159	9	99,92%	197163

160	10	99,93%	197173
161	6	99,93%	197179
162	6	99,93%	197185
163	4	99,94%	197189
164	4	99,94%	197193
165	12	99,94%	197205
166	2	99,94%	197207
167	7	99,95%	197214
168	6	99,95%	197220
169	5	99,95%	197225
170	4	99,96%	197229
171	1	99,96%	197230
172	1	99,96%	197231
173	7	99,96%	197238
174	8	99,96%	197246
175	5	99,97%	197251
176	3	99,97%	197254
177	2	99,97%	197256
178	2	99,97%	197258
179	6	99,97%	197264
180	2	99,97%	197266
181	2	99,98%	197268
182	3	99,98%	197271
183	3	99,98%	197274
184	1	99,98%	197275
185	3	99,98%	197278
186	3	99,98%	197281
187	2	99,98%	197283
188	2	99,98%	197285
189	2	99,99%	197287
190	1	99,99%	197288
191	4	99,99%	197292
192	0	99,99%	197292
193	1	99,99%	197293
194	0	99,99%	197293
195	0	99,99%	197293
196	1	99,99%	197294
197	5	99,99%	197299
198	0	99,99%	197299
199	1	99,99%	197300
200	1	99,99%	197301
201	2	99,99%	197303
202	0	99,99%	197303
203	0	99,99%	197303
204	1	99,99%	197304
205	1	99,99%	197305
206	1	99,99%	197306
207	0	99,99%	197306
208	1	100,00%	197307
209	0	100,00%	197307
210	0	100,00%	197307
211	0	100,00%	197307
212	2	100,00%	197309
213	0	100,00%	197309

214	1	100,00%	197310
215	0	100,00%	197310
216	0	100,00%	197310
217	0	100,00%	197310
218	0	100,00%	197310
219	0	100,00%	197310
220	0	100,00%	197310
221	0	100,00%	197310
222	0	100,00%	197310
223	0	100,00%	197310
224	1	100,00%	197311
225	0	100,00%	197311
226	0	100,00%	197311
227	0	100,00%	197311
228	0	100,00%	197311
229	0	100,00%	197311
230	1	100,00%	197312
231	1	100,00%	197313
232	0	100,00%	197313
233	1	100,00%	197314
234	0	100,00%	197314
235	0	100,00%	197314
236	0	100,00%	197314
237	0	100,00%	197314
238	0	100,00%	197314
239	0	100,00%	197314
240	0	100,00%	197314
241	0	100,00%	197314
242	0	100,00%	197314
243	0	100,00%	197314
244	0	100,00%	197314
245	0	100,00%	197314
246	1	100,00%	197315
247	0	100,00%	197315
248	0	100,00%	197315
249	0	100,00%	197315
250	0	100,00%	197315
251	0	100,00%	197315
252	0	100,00%	197315
253	0	100,00%	197315
254	0	100,00%	197315
255	1	100,00%	197316