```
C:\ProgramData\Anaconda3\python.exe Z:/Documentos/GitHub/ProjetoBB/Projeto-Final/Main.py
Found Numpy. WIll be used for storing data
Começando a leitura...
leu

saída: tempo x Vout




samples dos números aleatórios escolhidos:  '         0         1         2         3
          4         5         6     \
0   -0.137454  0.517669 -0.607186 -0.642495 -0.544930  1.000461 -0.602136
1   -1.539589 -1.662958 -0.904044 -0.584208 -0.632593 -1.823004 -0.099554
2   -1.433088 -1.268932 -1.620027 -1.650731 -1.635928 -1.144853 -1.629283
3    1.380453  1.449399  1.749187  2.313034  2.058468  1.424193  2.344976
4    0.054706  0.057827  0.064666  0.052996  0.056977  0.060401  0.051938
5    0.024793 -0.323291  0.628700  0.827146  0.714792 -0.863270  1.045445
6    0.460960 -0.106638  1.680779  1.643991  1.405558 -0.555069  1.678007
7   -0.586835 -0.142666 -0.458930 -0.423061 -0.585366  0.211623 -0.315562
8    1.501752  0.350404  1.495902  1.501357  1.687584  0.089320  1.412450
9   -0.499999 -0.551231 -0.303421 -0.194980 -0.239485 -0.678390 -0.033434
10   0.054706  0.057827  0.064666  0.052996  0.056977  0.060401  0.051938
11   0.054706  0.057827  0.064666  0.052996  0.056977  0.060401  0.051938
12  -2.524217 -2.509535 -2.169642 -1.995409 -2.045378 -2.319361 -1.850553
13  -1.500885 -1.510614 -1.409310 -1.362523 -1.395212 -1.522844 -1.277850
14  -0.051206 -0.012934  0.039623  0.147774  0.063752 -0.069791  0.167991
15  -0.575273 -0.538182 -0.047029  0.010991 -0.347383 -0.341789  0.082080
16   0.249173  0.282492  0.049375 -0.004540  0.143149  0.287508 -0.012646
```

29	17	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
30	18	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
31	19	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
32	20	-0.064194	0.009218	-0.664097	-0.848478	-0.250820	0.034575	-0.891671
33	21	0.338399	0.238583	0.195817	0.111932	0.302383	0.170754	0.080347
34	22	-0.736964	-1.231651	0.090509	0.006616	-0.235735	-1.369099	0.174081
35	23	1.380453	1.449399	1.749187	2.313034	2.058468	1.424193	2.344976
36	24	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
37	25	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
38	26	1.467197	1.389296	1.669140	1.745133	1.629483	1.385033	1.832341
39	27	0.013919	0.061889	-0.171335	-0.345803	0.002375	0.137459	-0.389377
40	28	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
41	29	-0.064194	0.009218	-0.664097	-0.848478	-0.250820	0.034575	-0.891671
42	..	...	...	...	...	...	...	...
43	93	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
44	94	-1.608461	-0.915664	-1.957430	-1.824206	-2.092768	-0.625504	-1.804400
45	95	0.493728	0.814882	-0.023243	-0.247473	0.135886	0.908478	-0.261677
46	96	-1.504697	-1.538045	-2.143924	-2.453635	-2.346877	-1.325449	-2.594151
47	97	0.839081	0.773894	-0.000548	-0.231639	-0.199527	1.148626	-0.586705
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50	100	-2.524217	-2.509535	-2.169642	-1.995409	-2.045378	-2.319361	-1.850553
51	101	-0.051206	-0.012934	0.039623	0.147774	0.063752	-0.069791	0.167991
52	102	-0.137454	0.517669	-0.607186	-0.642495	-0.544930	1.000461	-0.602136
53	103	1.467197	1.389296	1.669140	1.745133	1.629483	1.385033	1.832341
54	104	0.080087	0.083407	0.090293	0.078648	0.082659	0.085774	0.077712
55	105	0.338399	0.238583	0.195817	0.111932	0.302383	0.170754	0.080347
56	106	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
57	107	0.249173	0.282492	0.049375	-0.004540	0.143149	0.287508	-0.012646

58	108	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
59	109	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
60	110	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
61	111	1.467197	1.389296	1.669140	1.745133	1.629483	1.385033	1.832341
62	112	0.054706	-0.088588	0.064666	0.052996	0.056977	-0.141558	0.051938
63	113	-1.214041	-1.385727	-0.579840	-0.608432	-0.841382	-1.376749	-0.354817
64	114	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
65	115	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
66	116	0.895068	0.756521	0.656393	0.661503	0.765662	0.454636	0.270926
67	117	0.960083	0.627546	0.702466	0.390160	0.871613	-0.163982	0.371670
68	118	0.249173	0.282492	0.049375	-0.004540	0.143149	0.287508	-0.012646
69	119	0.054706	0.057827	0.064666	0.052996	0.056977	0.060401	0.051938
70	120	-1.539589	-1.662958	-0.904044	-0.584208	-0.632593	-1.823004	-0.099554
71	121	0.054706	0.057827	0.064666	0.052996	0.056977	-0.039621	0.051938
72	122	0.845492	0.905874	0.310178	0.042930	0.504645	0.731082	0.017183
73								
74		7	8	9	...	3290	3291	3292 \
75	0	-0.105138	-0.680297	-0.614529	...	0.578264	0.496678	0.588397
76	1	-0.750747	-0.477958	-0.726344	...	1.762360	1.621566	1.723797
77	2	-1.629128	-1.649423	-1.506318	...	-1.643591	-1.731895	-1.723864
78	3	1.950860	2.096976	1.858517	...	1.845889	1.920495	1.903958
79	4	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
80	5	0.554190	0.793373	0.664688	...	0.614349	0.750194	0.904269
81	6	0.392303	1.671831	1.572699	...	-0.644683	0.297002	-0.321480
82	7	-0.563469	-0.547338	-0.467634	...	0.139677	0.628645	0.355009
83	8	1.443817	1.572762	1.581732	...	-0.920853	-0.670572	-0.910261
84	9	-0.294941	-0.230870	-0.389197	...	0.245126	0.135922	0.201915
85	10	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
86	11	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040

87	12	-2.072468	-2.013177	-2.067829	...	-0.383328	-0.617379	-0.611181
88	13	-1.427144	-1.384927	-1.488689	...	-1.116172	-1.210127	-1.184460
89	14	0.042671	0.002630	0.040475	...	0.568422	0.459395	0.551222
90	15	-0.601945	-0.103623	-0.072963	...	-0.210681	0.253968	-0.086921
91	16	0.292612	0.027212	0.024631	...	-1.417120	-1.833313	-1.603151
92	17	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
93	18	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
94	19	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
95	20	-0.020471	-0.891790	-0.655391	...	0.769700	-0.282592	0.125926
96	21	0.346994	0.143601	0.154953	...	-1.859782	-1.980144	-2.009284
97	22	-0.768600	0.070665	-0.082445	...	1.121708	1.391794	1.244039
98	23	1.950860	2.096976	1.858517	...	1.845889	1.920495	1.903958
99	24	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
100	25	0.000000	0.000000	0.000000	...	0.000000	0.000000	0.000000
101	26	1.543891	1.751188	1.484902	...	1.463471	1.340449	1.472366
102	27	0.001728	-0.370365	-0.167103	...	-0.301234	-0.916412	-0.641590
103	28	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
104	29	-0.020471	-0.891790	-0.655391	...	0.769700	-0.282592	0.125926
105	..	...	...	...	...	...	...	...
106	93	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
107	94	-1.305777	-1.810209	-2.056029	...	0.653736	1.191667	0.934471
108	95	0.485751	-0.201866	0.054597	...	-0.005519	-0.025743	-0.005040
109	96	-2.291014	-2.368806	-2.258936	...	-1.362526	-1.488551	-1.480201
110	97	-0.102151	-0.193836	0.082765	...	-1.919358	-1.686331	-1.659363
111	98	-1.841333	-0.660093	-1.433375	...	-0.475975	0.114804	-0.449209
112	99	0.001728	-0.370365	-0.167103	...	-0.301234	-0.916412	-0.641590
113	100	-2.072468	-2.013177	-2.067829	...	-0.383328	-0.617379	-0.611181
114	101	0.042671	0.002630	0.040475	...	0.568422	0.459395	0.551222
115	102	-0.105138	-0.680297	-0.614529	...	0.578264	0.496678	0.588397

116	103	1.543891	1.751188	1.484902	...	1.463471	1.340449	1.472366
117	104	0.072504	0.084489	0.076350	...	0.022944	0.002356	0.023617
118	105	0.346994	0.143601	0.154953	...	-1.859782	-1.980144	-2.009284
119	106	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
120	107	0.292612	0.027212	0.024631	...	-1.417120	-1.833313	-1.603151
121	108	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
122	109	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
123	110	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
124	111	1.543891	1.751188	1.484902	...	1.463471	1.340449	1.472366
125	112	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
126	113	-1.243292	-0.527133	-0.768721	...	1.409659	1.415951	1.409606
127	114	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
128	115	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
129	116	0.951827	0.467628	0.794930	...	-1.142787	-1.101028	-1.079309
130	117	0.975104	0.538280	0.754904	...	-0.005519	-0.025743	-0.005040
131	118	0.292612	0.027212	0.024631	...	-1.417120	-1.833313	-1.603151
132	119	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
133	120	-0.750747	-0.477958	-0.726344	...	1.762360	1.621566	1.723797
134	121	0.047103	0.058972	0.050531	...	-0.005519	-0.025743	-0.005040
135	122	0.868915	0.138362	0.377331	...	-0.005519	-0.025743	-0.005040
136								
137		3293	3294	3295	3296	3297	3298	3299
138	0	0.596570	0.596846	0.559518	0.612639	0.547689	0.615039	0.617435
139	1	1.608951	1.458276	1.611034	1.624778	1.493630	1.748958	1.711274
140	2	-1.707238	-1.656345	-1.747904	-1.751360	-1.698744	-1.685526	-1.793150
141	3	1.922166	1.849339	1.956706	1.926280	1.923657	1.869918	2.006954
142	4	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
143	5	1.002380	1.130513	0.763279	0.607772	1.114219	0.706142	0.696512
144	6	-0.381065	-0.279326	0.184658	0.002671	0.040417	-0.411813	-0.161036

145	**7**	0.315716	0.352827	0.608972	0.429573	0.507003	0.268138	0.476292
146	**8**	-0.916476	-0.901797	-0.778310	-0.874697	-0.810849	-0.937775	-0.931327
147	**9**	0.208069	0.285819	0.060392	0.086324	0.202714	0.189377	0.021805
148	**10**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
149	**11**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
150	**12**	-0.665672	-0.707297	-0.554160	-0.557490	-0.715322	-0.537078	-0.525147
151	**13**	-1.177889	-1.103730	-1.228006	-1.234848	-1.175092	-1.159837	-1.285644
152	**14**	0.558660	0.651236	0.414369	0.436597	0.550547	0.531419	0.437086
153	**15**	-0.122642	-0.114537	0.127315	-0.072028	0.087486	-0.160684	-0.025027
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155	**17**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
156	**18**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
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158	**20**	0.419662	-0.075638	-0.045962	0.411323	-0.047870	0.388000	0.175148
159	**21**	-1.992165	-1.999939	-2.039651	-1.993193	-1.958574	-1.986299	-2.034944
160	**22**	1.210353	1.214822	1.394097	1.357277	1.323508	1.225624	1.308274
161	**23**	1.922166	1.849339	1.956706	1.926280	1.923657	1.869918	2.006954
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163	**25**	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
164	**26**	1.395352	1.520419	1.351581	1.376339	1.393942	1.501130	1.367658
165	**27**	-0.531092	-0.783706	-0.753770	-0.496078	-0.800582	-0.543538	-0.669684
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167	**29**	0.419662	-0.075638	-0.045962	0.411323	-0.047870	0.388000	0.175148
168	**..**	...	...	...	...	...	...	...
169	**93**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
170	**94**	0.836281	1.045610	1.076436	0.818909	1.043103	0.843494	0.933416
171	**95**	-0.006067	0.003170	-0.017056	-0.019184	-0.001403	-0.007868	-0.015609
172	**96**	-1.490875	-1.513193	-1.470294	-1.475165	-1.538084	-1.431346	-1.431662
173	**97**	-1.645897	-1.633820	-1.834499	-1.832672	-1.619795	-1.712315	-1.765807

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174 98  -0.523112 -0.188661 -0.078322 -0.431648 -0.211892 -0.590305 -0.458243
175 99  -0.531092 -0.783706 -0.753770 -0.496078 -0.800582 -0.543538 -0.669684
176 100 -0.665672 -0.707297 -0.554160 -0.557490 -0.715322 -0.537078 -0.525147
177 101  0.558660  0.651236  0.414369  0.436597  0.550547  0.531419  0.437086
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183 107 -1.534666 -1.680464 -1.730352 -1.578668 -1.789183 -1.526271 -1.634160
184 108 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
185 109 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
186 110 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
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194 118 -1.534666 -1.680464 -1.730352 -1.578668 -1.789183 -1.526271 -1.634160
195 119 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
196 120  1.608951  1.458276  1.611034  1.624778  1.493630  1.748958  1.711274
197 121 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
198 122 -0.006067  0.003170 -0.017056 -0.019184 -0.001403 -0.007868 -0.015609
199
200 [123 rows x 3300 columns]':
201 Variância total dos primeiros 1 componentes: 0.330469098197
202 Variância total dos primeiros 2 componentes: 0.552606945184
```

```
Variância total dos primeiros 3 componentes: 0.727552848867
Variância total dos primeiros 4 componentes: 0.801729226434
Variância total dos primeiros 5 componentes: 0.859966666594
Variância total dos primeiros 6 componentes: 0.899966215427

```