

Programs	b	LocFaults					BugAssist	
		P	L				P	L
			= 0	≤ 1	≤ 2	≤ 3		
BubbleSortV0	4	1.268	0.561	0.553	0.508	0.948	0.34	55.27
BubbleSortV1	5	0.781	0.597	0.627	0.762	1.331	0.22	125.40
BubbleSortV2	6	0.764	1.461	1.496	1.75	4.118	0.41	277.14
BubbleSortV3	7	0.774	0.813	0.852	1.468	12.67	0.53	612.79
BubbleSortV4	8	0.838	4.787	4.911	6.01	116.347	1.17	1074.67
BubbleSortV5	9	0.837	14.234	14.228	16.753	492.178	1.24	1665.62
BubbleSortV6	10	0.866	27.389	27.608	33.573	2078.445	1.53	2754.68
BubbleSortV7	11	0.876	56.008	62.198	69.591	4916.434	3.94	7662.90
BubbleSortV8	12	0.95	126.439	126.233	157.238	/	/	/
BubbleSortV9	13	0.917	235.282	244.805	282.796	/	/	/
BubbleSortV10	14	0.91	363.627	360.651	500.626	/	/	/
BubbleSortV11	15	0.969	437.994	438.549	715.594	/	/	/
BubbleSortV12	16	0.976	591.28	621.072	971.357	/	/	/
BubbleSortV13	17	1.019	737.541	739.541	1726.373	/	/	/
BubbleSortV14	18	1.038	954.475	1023.731	2197.53	/	/	/
BubbleSortV15	19	1.078	1230.099	1305.219	3477.862	/	/	/
BubbleSortV16	20	3.124	3647.636	4495.171	/	/	/	/
BubbleSortV17	21	2.458	4698.388	4316.524	/	/	/	/
BubbleSortV18	22	2.667	6580.013	6669.919	/	/	/	/

TABLE 1 – Le temps de calcul pour le benchmark BubbleSort

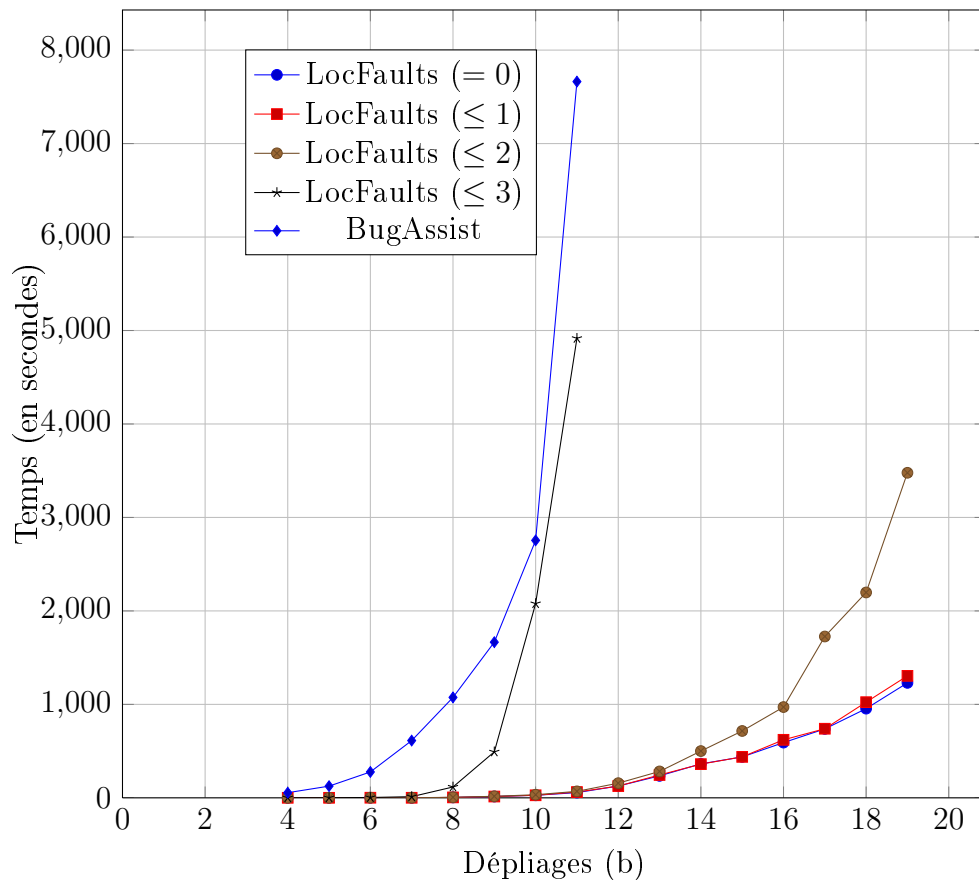


FIGURE 1 – Comparaison de l'évolution des temps des différentes versions de LocFaults et de BugAssist pour le benchmark BubbleSort, en faisant augmenter le nombre d'itérations en dépliant la boucle.

Programs	b	LocFaults					BugAssist	
		P	L				P	L
			= 0	≤ 1	≤ 2	≤ 3		
SumV0	6	0.765	0.427	0.766	0.547	0.608	0.04	2.19
SumV2	8	0.884	0.588	0.651	0.713	0.583	0.05	4.22
SumV4	10	1.109	1.015	2.645	1.993	2.103	0.06	5.98
SumV6	12	0.836	0.722	1.299	1.152	1.567	0.06	7.20
SumV8	14	0.865	0.509	1.347	1.048	1.308	0.06	10.14
SumV10	16	0.9	0.785	1.731	1.845	1.615	0.08	17.88
SumV12	18	1.086	1.188	4.592	4.558	3.279	0.09	21.31
SumV14	20	0.985	0.764	3.063	3.155	3.0	0.10	26.24
SumV16	22	1.345	1.194	6.146	6.823	7.216	0.13	33.18
SumV18	24	0.987	0.937	3.029	3.163	3.436	0.10	37.36
SumV20	26	1.11	1.449	7.27	7.264	6.34	0.12	53.85
SumV22	28	0.96	0.688	4.061	5.429	10.17	0.14	60.68
SumV24	30	0.999	0.956	3.696	3.714	3.809	0.12	80.80
SumV26	32	1.001	0.132	3.326	3.299	3.681	0.14	89.79
SumV28	34	1.103	1.173	8.356	6.706	6.187	0.15	81.19
SumV30	36	1.255	0.389	8.727	4.89	4.103	0.13	108.31
SumV32	38	1.061	0.821	7.475	4.176	4.502	0.13	127.10
SumV34	40	0.975	0.117	4.916	4.463	4.706	0.15	156.84
SumV36	42	1.008	0.121	4.914	5.448	5.202	0.16	169.73
SumV38	44	1.133	0.164	11.289	11.598	7.047	0.18	192.34
SumV40	46	1.052	0.129	5.258	5.746	13.558	0.23	206.77
SumV42	48	0.936	0.131	5.497	5.978	5.396	0.17	223.07
SumV44	50	1.042	0.148	6.129	6.451	6.384	0.20	259.24
SumV46	52	0.987	0.143	6.367	6.273	6.163	0.20	285.80
SumV48	54	1.15	0.216	17.045	13.168	13.819	0.24	293.56
SumV50	56	1.06	0.163	7.328	6.891	6.781	0.22	341.41
SumV52	58	1.183	0.186	14.605	14.619	8.055	0.23	368.68
SumV54	60	1.198	0.197	16.75	11.041	8.553	0.23	415.34
SumV56	62	1.11	0.162	8.993	8.939	9.03	0.24	442.89
SumV58	64	1.16	0.186	10.183	11.178	11.205	0.29	674.55
SumV60	66	1.588	0.235	13.998	13.343	14.698	0.36	593.82
SumV62	68	1.702	0.249	24.791	23.685	21.123	0.34	598.82
SumV64	70	1.075	0.174	30.579	22.683	21.921	0.29	527.41
SumV66	72	1.052	0.152	14.736	9.673	10.175	0.23	407.33
SumV68	74	0.809	0.138	9.449	10.159	10.206	0.23	416.81
SumV70	76	0.82	0.141	10.066	9.453	10.531	0.24	455.76
SumV72	78	0.925	0.215	28.695	22.109	13.366	0.26	460.84
SumV74	80	0.809	0.146	11.372	11.48	20.915	0.37	514.36
SumV76	82	0.862	0.145	11.903	12.923	12.487	0.24	511.29
SumV78	84	0.819	0.156	13.208	22.694	27.336	0.30	568.54
SumV80	86	0.789	0.141	13.03	12.643	12.843	0.24	548.83
SumV82	88	0.834	0.158	25.336	30.778	21.9	0.30	634.07
SumV84	90	0.789	0.156	15.47	15.203	15.67	0.26	617.77
SumV86	92	0.836	0.162	16.353	16.05	37.395	0.31	700.87
SumV88	94	0.835	0.173	16.336	16.185	30.523	0.42	668.30
SumV90	96	0.803	0.157	34.994	28.939	18.141	0.31	785.64
SumV92	98	0.875	0.159	19.218	37.227	24.283	0.33	752.92
SumV94	100	1.003	0.187	21.328	37.653	27.856	0.34	978.51

TABLE 2 – Le temps de calcul pour le benchmark Sum

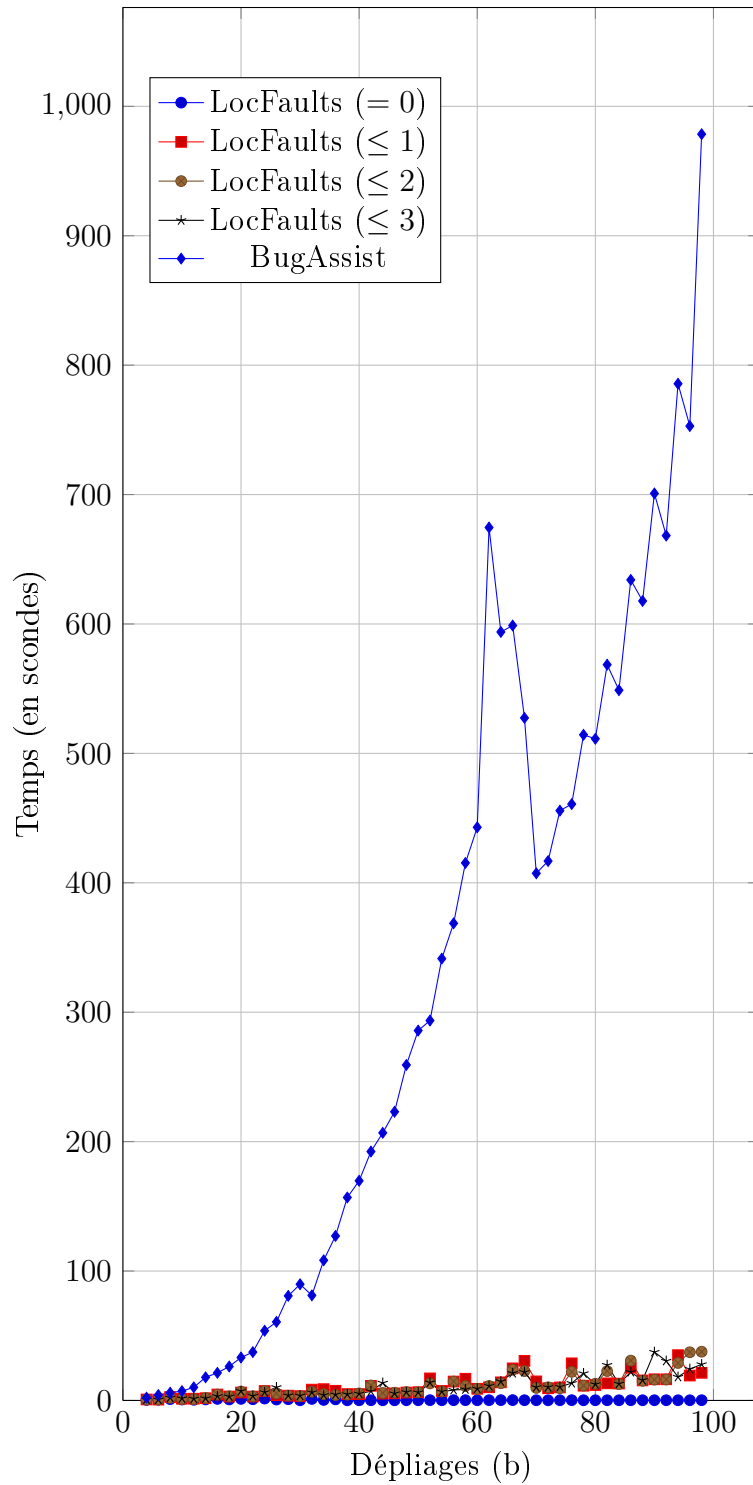


FIGURE 2 – Comparaison de l'évolution des temps des différentes versions de `LocFaults` et de `BugAssist` pour le benchmark `Sum`, en faisant augmenter le nombre d'itérations en dépliant la boucle.

Programs	b	LocFaults				BugAssist		
		P	L				P	L
			= 0	≤ 1	≤ 2	≤ 3		
SquareRootV0	10	1.096	1.737	2.098	2.113	2.066	0.05	3.51
SquareRootV1	11	1.211	1.983	2.457	1.852	2.15	0.06	3.35
SquareRootV2	12	1.128	1.97	1.809	2.335	2.074	0.06	3.74
SquareRootV3	13	1.191	1.885	1.908	2.235	2.384	0.06	4.88
SquareRootV4	14	1.155	1.908	2.096	2.408	1.881	0.06	5.30
SquareRootV5	15	1.247	1.832	2.329	2.466	1.871	0.06	5.55
SquareRootV6	16	1.122	1.749	2.366	2.902	2.386	0.06	6.60
SquareRootV7	17	1.258	1.799	2.188	2.873	2.024	0.06	6.50
SquareRootV8	18	0.737	0.974	1.144	1.126	1.149	0.05	6.08
SquareRootV9	19	0.751	0.997	1.145	1.12	1.128	0.05	5.64
SquareRootV10	20	0.724	0.974	1.131	1.117	1.099	0.05	6.54
SquareRootV11	21	0.753	1.016	1.117	1.116	1.124	0.06	6.66
SquareRootV12	22	0.756	1.014	1.145	1.121	1.124	0.06	6.71
SquareRootV13	23	0.734	0.993	1.1	1.154	1.154	0.05	7.70
SquareRootV14	24	0.757	1.01	1.115	1.124	1.132	0.06	7.67
SquareRootV15	25	0.768	1.046	1.177	1.195	1.199	0.05	12.58
SquareRootV16	26	0.744	1.026	1.164	1.174	1.22	0.06	10.76
SquareRootV17	27	0.758	1.022	1.163	1.155	1.212	0.06	12.78
SquareRootV18	28	0.728	0.983	1.172	1.209	1.147	0.07	12.74
SquareRootV19	29	0.724	1.015	1.27	1.249	1.282	0.06	13.64
SquareRootV20	30	0.771	1.048	1.16	1.171	1.223	0.08	12.32
SquareRootV21	31	0.788	1.045	1.15	1.178	1.19	0.07	15.74
SquareRootV22	32	0.735	1.025	1.167	1.134	1.166	0.07	16.45
SquareRootV23	33	0.728	1.015	1.201	1.22	1.155	0.07	17.83
SquareRootV24	34	0.756	0.987	1.209	1.224	1.16	0.08	17.68
SquareRootV25	35	0.742	0.981	1.163	1.206	1.194	0.08	20.99
SquareRootV26	36	0.738	1.034	1.202	1.186	1.226	0.09	19.90
SquareRootV27	37	0.745	1.03	1.247	1.25	1.222	0.10	19.72
SquareRootV28	38	0.743	1.01	1.214	1.246	1.243	0.09	22.55
SquareRootV29	39	0.751	1.047	1.203	1.222	1.249	0.09	22.69
SquareRootV30	40	0.765	1.048	1.248	1.266	1.28	0.09	23.35
SquareRootV31	41	0.737	1.021	1.241	1.255	1.247	0.09	22.86
SquareRootV32	42	0.743	1.062	1.24	1.257	1.257	0.10	23.64
SquareRootV33	43	0.751	1.043	1.226	1.237	1.269	0.10	27.51
SquareRootV34	44	0.761	1.033	1.216	1.242	1.286	0.10	27.19
SquareRootV35	45	0.764	1.044	1.231	1.291	1.251	0.10	29.28
SquareRootV36	46	0.756	1.053	1.227	1.297	1.199	0.11	30.27
SquareRootV37	47	0.754	1.036	1.23	1.269	1.277	0.11	29.90
SquareRootV38	48	0.758	1.05	1.238	1.246	1.226	0.11	30.00
SquareRootV39	49	0.751	1.05	1.284	1.266	1.265	0.10	36.32
SquareRootV40	50	0.769	1.089	1.271	1.291	1.299	0.12	36.16
SquareRootV41	51	0.727	1.033	1.26	1.267	1.31	0.12	34.46
SquareRootV42	52	0.741	1.038	1.289	1.302	1.286	0.12	34.09
SquareRootV43	53	0.763	1.025	1.244	1.225	1.217	0.12	42.99
SquareRootV44	54	0.753	1.046	1.272	1.297	1.291	0.12	39.28
SquareRootV45	55	0.759	1.074	1.245	1.292	1.336	0.13	38.81
SquareRootV46	56	0.76	1.085	1.305	1.26	1.281	0.13	39.42
SquareRootV47	57	0.79	1.063	1.259	1.249	1.218	0.13	42.27
SquareRootV48	58	0.76	1.013	1.255	1.25	1.275	0.12	42.87
SquareRootV49	59	0.783	1.096	1.205	1.305	1.307	0.13	44.93

SquareRoot V50	60	0.741	1.041	1.251	1.265	1.281	0.14	38.22
SquareRoot V51	61	0.791	1.112	1.278	1.281	1.301	0.13	46.18
SquareRoot V52	62	0.752	1.07	1.313	1.285	1.321	0.14	44.53
SquareRoot V53	63	0.793	1.074	1.3	1.253	1.306	0.15	45.45
SquareRoot V54	64	0.775	1.107	1.367	1.424	1.368	0.14	47.91
SquareRoot V55	65	0.75	1.113	1.411	1.364	1.328	0.14	51.55
SquareRoot V56	66	0.765	1.104	1.349	1.361	1.386	0.15	50.51
SquareRoot V57	67	0.789	1.119	1.334	1.411	1.423	0.16	51.83
SquareRoot V58	68	0.768	1.111	1.417	1.385	1.417	0.15	53.82
SquareRoot V59	69	0.792	1.077	1.356	1.318	1.292	0.15	56.22
SquareRoot V60	70	0.778	1.118	1.417	1.424	1.408	0.15	55.15
SquareRoot V61	71	0.774	1.094	1.353	1.418	1.378	0.16	56.52
SquareRoot V62	72	0.788	1.103	1.305	1.353	1.31	0.15	56.00
SquareRoot V63	73	0.781	1.122	1.383	1.463	1.404	0.18	55.55
SquareRoot V64	74	0.756	1.03	1.355	1.4	1.401	0.18	57.12
SquareRoot V65	75	0.81	1.118	1.297	1.379	1.297	0.15	59.67
SquareRoot V66	76	0.744	1.042	1.417	1.433	1.443	0.18	53.98
SquareRoot V67	77	0.789	1.129	1.412	1.408	1.361	0.19	57.38
SquareRoot V68	78	0.789	1.126	1.393	1.37	1.361	0.20	56.68
SquareRoot V69	79	0.764	1.102	1.352	1.367	1.391	0.19	57.75
SquareRoot V70	80	0.769	1.114	1.407	1.424	1.386	0.19	57.09
SquareRoot V71	81	0.81	1.149	1.439	1.463	1.545	0.19	69.00
SquareRoot V72	82	0.777	1.071	1.36	1.369	1.293	0.19	64.40
SquareRoot V73	83	0.784	1.137	1.446	1.472	1.427	0.20	67.80
SquareRoot V74	84	0.785	1.093	1.369	1.335	1.376	0.20	67.25
SquareRoot V75	85	0.818	1.158	1.41	1.364	1.373	0.20	65.55
SquareRoot V76	86	0.799	1.155	1.478	1.434	1.487	0.21	69.78
SquareRoot V77	87	0.788	1.152	1.388	1.452	1.576	0.21	68.32
SquareRoot V78	88	0.795	1.156	1.452	1.476	1.494	0.22	68.66
SquareRoot V79	89	0.767	1.12	1.475	1.444	1.518	0.20	67.41
SquareRoot V80	90	0.744	1.085	1.454	1.393	1.505	0.22	64.94
SquareRoot V81	91	0.794	1.081	1.433	1.356	1.374	0.22	70.76
SquareRoot V82	92	0.763	1.101	1.416	1.406	1.361	0.21	66.88
SquareRoot V83	93	0.763	1.082	1.364	1.447	1.397	0.24	70.20
SquareRoot V84	94	0.766	1.123	1.465	1.478	1.41	0.22	66.38
SquareRoot V85	95	0.747	1.09	1.463	1.408	1.422	0.23	66.82
SquareRoot V86	96	0.743	1.101	1.447	1.47	1.437	0.23	65.36
SquareRoot V87	97	0.751	1.035	1.424	1.327	1.425	0.22	70.84
SquareRoot V88	98	0.784	1.135	1.452	1.503	1.488	0.24	72.02
SquareRoot V89	99	0.78	1.094	1.514	1.498	1.456	0.25	71.42
SquareRoot V90	100	0.791	1.168	1.605	1.616	1.613	0.24	80.81

TABLE 3 – Le temps de calcul pour le benchmark SquareRoot

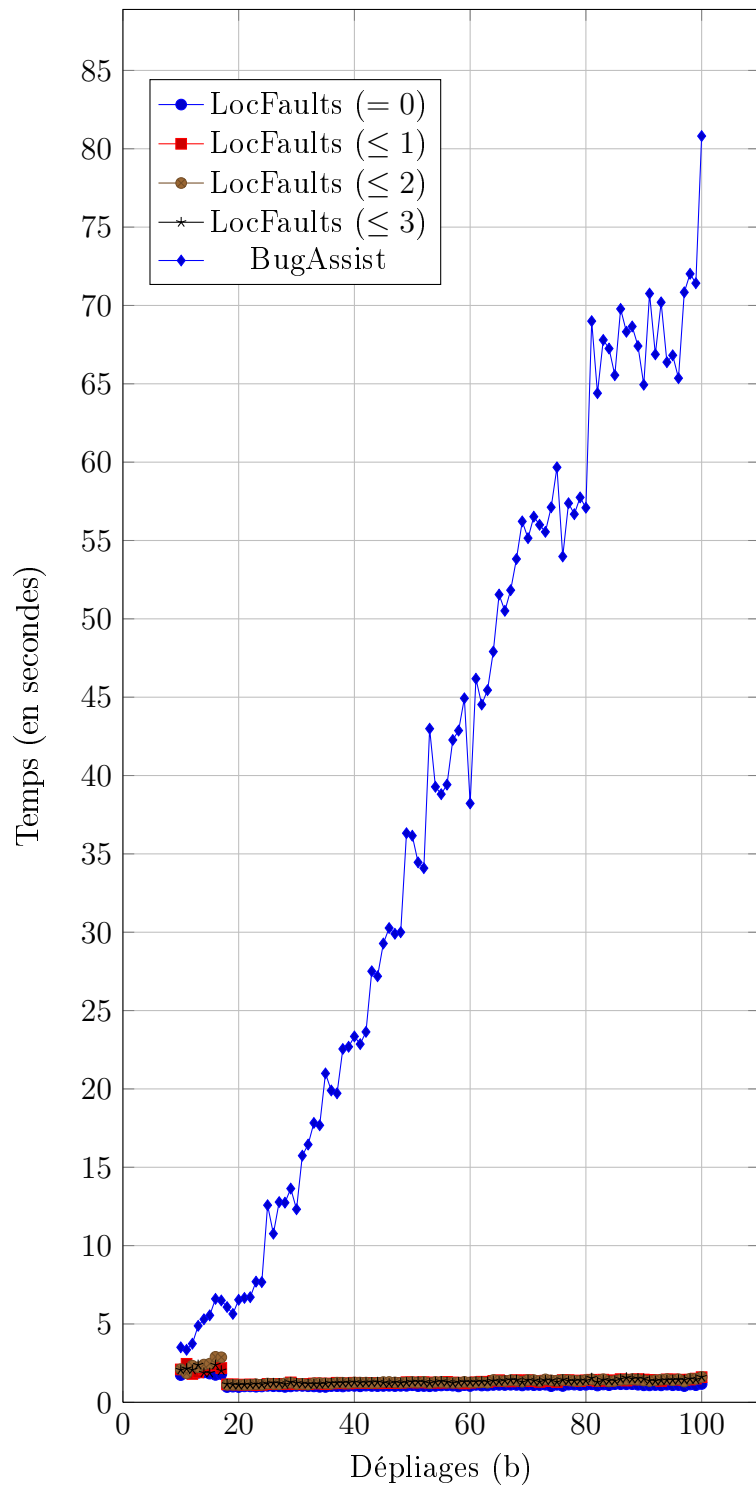


FIGURE 3 – Comparaison de l'évolution des temps des différentes versions de `LocFaults` et de `BugAssist` pour le benchmark `SquareRoot`, en faisant augmenter le nombre d'itérations en dépliant la boucle.