Job Shop Scheduling
Algoritmos Evolutivos
Estadísticas
Grupo 12

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1 Aclaraciones:

En la sección 4, disponemos de dos tablas para cada caso. La primera realiza una comparación con los parámentros mencionados en el informe primario. La segunda tabla corresponde al estudio estadístico secundario, es decir, en la primera tabla determinamos si ambas muestras tanto de CHC como de GA son normales, en caso de que ambas lo sean, se procede a realizar el test de t-student(t-test), en caso contrario se utiliza el test de Mann-Whitney para el estudio de la mediana de las dos muestras.

1.1 Normalidad

Se utilizó el test de D Agostino para determinar a través del estadístico si la muestra es normal.

1.2 t-test

En el caso que ambas muestras para cada instancia sean normales, se aplica el test de student, con un valor de $\alpha = 0.05$. Se determina el $p-valor$, sujeto a la hipótesis $H_0 = \mu_1 - \mu_2 > 0$, si $p-valor > \alpha$ entonces aceptamos H_0, caso contrario la rechazamos. Este test lo utilizamos para determinar la media de las muestras, con H_0 estamos determinando que la media del espacio muestral de GA es mayor que de CHC, esto es $mean(X_1) > mean(X_2)$.

1.3 u-test

También conocido como test de Mann-Whitney, se aplica la misma hipótesis que en el caso anterior, con el mismo valor de α. Este test detecta cual de las medianas de los conjuntos es mayor, $mediana(X_1) > mediana(X_2)$.

2 GA

2.1 Caso 1:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1250	1 285.133 3	20.001 2	4.693 2	0.279 3	*Si*
abz6	943	966.133 3	15.059 3	4.821 6	0.279 3	*Si*
abz7	726	760.066 7	16.459 9	14.739 1	0.282 7	*Si*
abz8	750	771.333 3	15.539 9	14.703 7	0.265 5	*No*
abz9	758	797.100 0	17.539 2	15.162 1	0.278 8	*Si*
la01	666	672.166 7	9.743 7	2.421 4	0.229 2	*No*
la02	655	669.700 0	10.501 3	2.413 5	0.263 0	*No*
la03	597	617.800 0	13.602 5	2.427 4	0.277 9	*Si*
la04	590	602.266 7	10.376 0	2.538 1	0.265 2	*No*
la05	593	593.000 0	0.000 0	2.414 7	NaN	*Si*
la06	926	926.000 0	0.000 0	3.514 3	NaN	*Si*
la29	1248	1 309.533 3	32.145 2	9.610 9	0.284 9	*Si*
mt06	55	55.000 0	0.000 0	1.879 8	NaN	*Si*
mt10	979	1 019.466 7	22.740 2	4.701 2	0.285 1	*Si*
mt20	1178	1 248.066 7	27.234 7	4.795 0	0.269 3	*Si*
orb1	1110	1 161.766 7	22.115 9	4.976 7	0.284 9	*Si*
orb2	909	936.400 0	17.543 5	4.893 8	0.269 4	*Si*
orb3	1051	1 134.500 0	42.246 7	4.832 7	0.276 7	*Si*
orb4	1026	1 061.633 3	20.779 0	4.940 1	0.283 9	*Si*
orb5	913	973.766 7	38.542 3	4.711 0	0.276 4	*Si*

Table 1: $P_C = 0.6, P_M = 0.01, \#Individuos = 50$

2.2 Caso 2:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1250	1 294.666 7	23.218 3	4.772 3	0.273 9	*Si*
abz6	947	972.433 3	15.224 3	4.871 1	0.262 0	*No*
abz7	720	764.533 3	16.918 9	14.678 1	0.277 8	*Si*
abz8	746	775.966 7	17.827 8	14.940 3	0.265 5	*No*
abz9	777	807.300 0	18.213 8	14.894 3	0.267 3	*Si*
la01	666	670.233 3	8.228 7	2.566 9	0.205 4	*No*
la02	655	670.000 0	13.672 4	2.569 6	0.265 1	*No*
la03	597	617.200 0	9.662 3	2.579 7	0.280 7	*Si*
la04	590	601.000 0	7.492 2	2.572 6	0.274 1	*Si*
la05	593	593.000 0	0.000 0	2.579 0	NaN	*Si*
la06	926	926.000 0	0.000 0	3.742 5	NaN	*Si*
la29	1256	1 315.833 3	26.269 2	9.639 9	0.283 9	*Si*
mt06	55	55.200 0	0.600 0	1.946 9	0.150 0	*No*
mt10	968	1 016.300 0	26.302 3	4.978 3	0.284 5	*Si*
mt20	1193	1 257.366 7	35.681 4	4.901 9	0.279 4	*Si*
orb1	1104	1 157.200 0	31.205 1	4.982 3	0.278 7	*Si*
orb2	915	942.433 3	15.074 7	5.034 3	0.277 1	*Si*
orb3	1074	1 139.633 3	34.937 5	5.229 1	0.283 6	*Si*
orb4	1027	1 061.566 7	21.472 0	5.023 9	0.276 3	*Si*
orb5	904	974.566 7	38.151 2	4.991 6	0.281 5	*Si*

Table 2: P_C =0.6, P_M =0.01, $\#Individuos = 100$

2.3 Caso 3:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1250	1 292.300 0	24.851 8	5.055 8	0.283 8	*Si*
abz6	945	971.833 3	17.156 3	5.051 5	0.284 8	*Si*
abz7	739	767.800 0	14.150 1	15.001 2	0.282 1	*Si*
abz8	757	779.066 7	16.635 2	14.978 2	0.273 2	*Si*
abz9	771	806.600 0	18.573 5	14.969 8	0.273 6	*Si*
la01	666	668.333 3	5.787 0	2.718 3	0.172 6	*No*
la02	655	668.700 0	7.160 8	2.674 4	0.275 7	*Si*
la03	603	618.466 7	12.249 4	2.718 8	0.282 3	*Si*
la04	590	599.733 3	7.178 4	2.675 7	0.279 9	*Si*
la05	593	593.000 0	0.000 0	2.671 4	NaN	*Si*
la06	926	926.000 0	0.000 0	3.861 6	NaN	*Si*
la29	1257	1 319.033 3	37.931 9	9.797 7	0.284 6	*Si*
mt06	55	55.066 7	0.359 0	1.939 2	0.089 8	*No*
mt10	993	1 033.800 0	32.639 9	5.055 9	0.279 4	*Si*
mt20	1198	1 244.866 7	27.513 3	4.968 0	0.283 5	*Si*
orb1	1106	1 163.400 0	31.575 9	5.041 0	0.275 1	*Si*
orb2	901	937.900 0	20.381 9	5.062 8	0.280 5	*Si*
orb3	1050	1 126.466 7	38.222 8	5.048 3	0.284 5	*Si*
orb4	1031	1 066.100 0	21.698 5	5.062 0	0.273 6	*Si*
orb5	890	974.800 0	32.431 9	5.077 5	0.275 7	*Si*

Table 3: P_C =0.6, P_M =0.01, $\#Individuos = 200$

2.4 Caso 4:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1251	1 283.166 7	18.815 0	5.262 1	0.286 3	*Si*
abz6	958	979.433 3	15.491 3	5.143 9	0.278 3	*Si*
abz7	723	757.900 0	16.988 9	16.053 3	0.283 2	*Si*
abz8	731	772.400 0	15.085 5	15.991 5	0.276 1	*Si*
abz9	774	799.300 0	16.383 2	16.057 3	0.278 9	*Si*
la01	666	670.600 0	8.708 6	2.700 8	0.206 7	*No*
la02	655	666.800 0	9.392 9	2.703 9	0.258 1	*No*
la03	597	617.833 3	12.543 5	2.717 4	0.283 3	*Si*
la04	590	600.866 7	7.906 7	2.726 7	0.281 6	*Si*
la05	593	593.000 0	0.000 0	2.662 6	NaN	*Si*
la06	926	926.000 0	0.000 0	3.973 2	NaN	*Si*
la29	1264	1 308.900 0	28.508 9	10.534 5	0.273 0	*Si*
mt06	55	55.000 0	0.000 0	1.985 9	NaN	*Si*
mt10	971	1 023.533 3	27.189 1	5.105 5	0.276 5	*Si*
mt20	1199	1 248.233 3	31.231 1	5.121 0	0.283 3	*Si*
orb1	1123	1 158.200 0	20.039 0	5.108 8	0.265 8	*No*
orb2	900	939.733 3	17.324 2	5.120 8	0.277 8	*Si*
orb3	1047	1 147.700 0	43.316 8	5.109 3	0.282 8	*Si*
orb4	1012	1 058.033 3	25.719 6	5.288 8	0.283 1	*Si*
orb5	896	976.500 0	34.188 4	5.330 7	0.275 6	*Si*

Table 4: P_C =0.7, P_M =0.01, $\#Individuos = 50$

2.5 Caso 5:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1242	1 284.433 3	25.283 3	5.590 6	0.261 7	*No*
abz6	947	970.900 0	16.365 3	5.275 0	0.282 0	*Si*
abz7	732	759.533 3	16.928 7	16.648 5	0.271 9	*Si*
abz8	746	772.666 7	15.397 7	16.603 3	0.279 7	*Si*
abz9	762	798.400 0	17.073 6	16.875 2	0.284 0	*Si*
la01	666	671.000 0	8.767 4	2.752 9	0.218 1	*No*
la02	655	666.833 3	11.384 4	2.779 1	0.270 3	*Si*
la03	597	614.600 0	9.311 6	2.719 7	0.268 4	*Si*
la04	590	602.700 0	8.323 3	2.744 2	0.282 3	*Si*
la05	593	593.000 0	0.000 0	2.718 4	NaN	*Si*
la06	926	926.000 0	0.000 0	4.041 7	NaN	*Si*
la29	1247	1 311.300 0	25.880 7	10.963 3	0.273 6	*Si*
mt06	55	55.166 7	0.636 8	2.109 8	0.123 0	*No*
mt10	951	1 021.166 7	30.459 9	5.344 3	0.275 2	*Si*
mt20	1181	1 253.933 3	39.196 0	5.222 0	0.282 9	*Si*
orb1	1103	1 156.666 7	26.093 8	5.497 0	0.276 7	*Si*
orb2	894	926.300 0	14.679 1	5.473 8	0.262 2	*No*
orb3	1077	1 128.666 7	33.679 2	5.624 3	0.286 8	*No*
orb4	1012	1 055.466 7	18.289 8	5.739 0	0.278 2	*Si*
orb5	925	973.833 3	30.623 6	5.528 1	0.284 6	*Si*

Table 5: P_C =0.8, P_M =0.01, $\#Individuos = 50$

2.6 Caso 6:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1242	1 281.066 7	21.304 0	5.002 1	0.275 2	*Si*
abz6	945	969.500 0	17.366 2	4.915 6	0.275 7	*Si*
abz7	731	761.133 3	16.999 5	15.186 7	0.283 8	*Si*
abz8	754	771.400 0	12.901 2	15.049 6	0.280 3	*Si*
abz9	752	796.400 0	17.571 9	15.091 6	0.279 4	*Si*
la01	666	670.666 7	8.291 9	2.565 2	0.217 9	*No*
la02	655	666.000 0	9.818 4	2.577 5	0.271 6	*Si*
la03	603	616.533 3	9.440 1	2.618 2	0.279 8	*Si*
la04	590	602.433 3	7.423 8	2.576 5	0.283 4	*Si*
la05	593	593.000 0	0.000 0	2.537 2	NaN	*Si*
la06	926	926.000 0	0.000 0	3.759 0	NaN	*Si*
la29	1262	1 307.666 7	29.886 8	9.898 4	0.280 5	*Si*
mt06	55	55.133 3	0.498 9	1.888 4	0.124 7	*No*
mt10	978	1 027.500 0	22.405 0	4.930 2	0.271 6	*Si*
mt20	1202	1 259.066 7	27.929 6	4.921 4	0.282 9	*Si*
orb1	1111	1 162.333 3	28.113 3	4.972 3	0.286 4	*Si*
orb2	893	932.366 7	20.257 5	4.959 6	0.284 8	*Si*
orb3	1069	1 126.900 0	31.891 8	4.951 6	0.282 3	*Si*
orb4	1011	1 057.000 0	24.804 6	5.021 1	0.276 6	*Si*
orb5	912	974.733 3	32.556 5	5.008 6	0.277 4	*Si*

Table 6: P_C =0.6, P_M =0.05, $\#Individuos = 50$

2.7 Caso 7:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1249	1 280.100 0	17.125 7	5.037 1	0.272 2	*Si*
abz6	945	969.466 7	14.389 2	5.031 2	0.265 2	*No*
abz7	732	759.400 0	14.302 9	15.963 3	0.284 4	*Si*
abz8	746	774.433 3	18.911 5	15.785 6	0.279 6	*Si*
abz9	775	798.933 3	16.403 1	15.690 6	0.281 9	*Si*
la01	666	668.266 7	6.582 5	2.579 8	0.154 1	*No*
la02	655	669.000 0	10.767 2	2.595 8	0.259 3	*No*
la03	597	612.033 3	10.176 7	2.692 1	0.273 1	*Si*
la04	590	604.166 7	7.439 0	2.620 1	0.272 8	*Si*
la05	593	593.000 0	0.000 0	2.577 3	NaN	*Si*
la06	926	926.000 0	0.000 0	3.913 5	NaN	*Si*
la29	1264	1 310.400 0	25.890 3	10.077 8	0.285 7	*Si*
mt06	55	55.200 0	0.600 0	1.992 6	0.150 0	*No*
mt10	958	1 033.233 3	28.893 7	5.099 1	0.278 2	*Si*
mt20	1203	1 259.400 0	35.999 6	5.009 2	0.282 7	*Si*
orb1	1122	1 166.133 3	24.405 9	5.163 3	0.280 4	*Si*
orb2	894	938.100 0	20.965 6	5.033 5	0.266 8	*Si*
orb3	1074	1 134.500 0	31.562 4	5.015 2	0.284 4	*Si*
orb4	1031	1 062.533 3	28.221 4	5.170 9	0.249 7	*No*
orb5	914	970.566 7	26.750 3	5.170 4	0.278 2	*Si*

Table 7: P_C =0.7, P_M =0.05, $\#Individuos = 50$

2.8 Caso 8:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1249	1 284.100 0	24.114 1	5.930 7	0.278 4	*Si*
abz6	945	968.033 3	16.416 4	5.372 2	0.279 3	*Si*
abz7	727	759.000 0	15.722 6	16.875 2	0.282 0	*Si*
abz8	735	771.266 7	19.641 7	17.224 9	0.281 1	*Si*
abz9	765	800.333 3	13.491 6	17.024 3	0.278 5	*Si*
la01	666	669.900 0	8.109 0	2.946 5	0.195 5	*No*
la02	655	670.800 0	9.934 5	3.140 7	0.253 4	*No*
la03	597	612.966 7	10.725 3	2.859 7	0.280 8	*Si*
la04	590	601.466 7	7.851 7	2.802 1	0.274 0	*Si*
la05	593	593.000 0	0.000 0	2.838 4	NaN	*Si*
la06	926	926.000 0	0.000 0	4.076 0	NaN	*Si*
la29	1265	1 317.033 3	29.835 6	11.065 2	0.287 3	*No*
mt06	55	55.300 0	0.781 0	2.135 4	0.168 6	*No*
mt10	964	1 031.366 7	31.128 2	5.636 6	0.276 3	*Si*
mt20	1201	1 247.633 3	25.964 7	5.390 4	0.276 0	*Si*
orb1	1119	1 164.566 7	26.044 4	5.624 1	0.287 2	*No*
orb2	907	934.033 3	18.872 3	5.554 1	0.277 6	*Si*
orb3	1089	1 151.566 7	41.478 3	5.702 3	0.282 8	*Si*
orb4	1012	1 056.633 3	22.178 8	5.728 5	0.284 5	*Si*
orb5	909	969.133 3	32.589 1	5.817 4	0.284 5	*Si*

Table 8: P_C =0.8, P_M =0.05, $\#Individuos = 50$

2.9 Caso 9:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1250	1 287.066 7	21.189 5	4.946 6	0.275 5	*Si*
abz6	947	974.166 7	17.731 5	4.965 1	0.282 0	*Si*
abz7	725	759.466 7	16.728 7	15.209 0	0.268 1	*Si*
abz8	738	770.133 3	14.155 6	15.170 3	0.274 8	*Si*
abz9	775	807.466 7	18.501 8	15.050 0	0.282 5	*Si*
la01	666	671.333 3	8.836 8	2.518 6	0.225 8	*No*
la02	655	669.400 0	9.218 1	2.535 8	0.271 1	*Si*
la03	603	616.800 0	11.740 0	2.521 1	0.278 6	*Si*
la04	590	605.300 0	14.888 8	2.462 4	0.249 2	*No*
la05	593	593.000 0	0.000 0	2.556 2	NaN	*Si*
la06	926	926.000 0	0.000 0	3.768 7	NaN	*Si*
la29	1266	1 308.300 0	34.238 5	9.937 3	0.279 4	*Si*
mt06	55	55.133 3	0.498 9	1.837 7	0.124 7	*No*
mt10	951	1 027.366 7	27.430 5	5.033 5	0.273 2	*Si*
mt20	1193	1 242.500 0	24.620 8	4.891 2	0.283 9	*Si*
orb1	1123	1 160.866 7	21.623 6	4.902 1	0.279 2	*Si*
orb2	897	941.100 0	22.196 6	4.936 1	0.259 9	*No*
orb3	1073	1 130.733 3	33.733 2	4.864 8	0.278 2	*Si*
orb4	1026	1 058.666 7	19.418 8	4.957 3	0.279 4	*Si*
orb5	895	975.200 0	35.084 1	4.932 3	0.275 0	*Si*

Table 9: P_C =0.6, P_M =0.1, $\#Individuos = 50$

2.10 Caso 10:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1259	1 284.866 7	16.372 2	5.139 7	0.279 3	*Si*
abz6	947	972.633 3	16.326 8	5.156 2	0.273 1	*Si*
abz7	728	758.966 7	13.617 4	15.914 1	0.280 9	*Si*
abz8	754	772.966 7	14.288 7	16.095 9	0.274 5	*Si*
abz9	769	800.900 0	18.170 2	16.632 7	0.286 5	*Si*
la01	666	670.200 0	8.243 8	2.707 4	0.204 5	*No*
la02	655	667.466 7	7.575 1	2.710 8	0.281 9	*Si*
la03	597	620.200 0	12.141 9	2.663 8	0.264 9	*No*
la04	593	601.400 0	7.427 9	2.616 5	0.262 1	*No*
la05	593	593.000 0	0.000 0	2.695 5	NaN	*Si*
la06	926	926.000 0	0.000 0	4.087 4	NaN	*Si*
la29	1262	1 309.700 0	24.855 8	10.357 0	0.257 5	*No*
mt06	55	55.233 3	0.715 7	1.962 9	0.148 3	*No*
mt10	964	1 023.966 7	27.029 0	5.203 4	0.283 5	*Si*
mt20	1204	1 245.233 3	23.819 7	5.203 8	0.284 7	*Si*
orb1	1091	1 153.666 7	30.325 3	5.236 2	0.278 2	*Si*
orb2	911	938.766 7	17.736 4	5.232 5	0.286 0	*Si*
orb3	1061	1 134.766 7	37.553 2	5.123 0	0.285 2	*Si*
orb4	1022	1 054.633 3	17.573 6	5.240 5	0.283 2	*Si*
orb5	910	972.933 3	36.109 0	5.222 9	0.284 0	*Si*

Table 10: P_C =0.7, P_M =0.1, $\#Individuos = 50$

2.11 Caso 11:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1239	1 285.166 7	24.184 1	5.354 0	0.285 1	*Si*
abz6	947	974.400 0	17.346 7	5.533 6	0.267 6	*Si*
abz7	724	762.966 7	17.694 6	16.946 8	0.280 4	*Si*
abz8	734	770.266 7	19.590 7	16.802 1	0.280 5	*Si*
abz9	763	798.666 7	17.812 6	17.140 9	0.278 1	*Si*
la01	666	668.700 0	6.283 0	2.790 8	0.184 5	*No*
la02	655	667.500 0	10.068 9	2.888 0	0.269 2	*Si*
la03	597	615.900 0	12.133 6	2.861 0	0.276 5	*Si*
la04	590	601.133 3	7.288 0	2.849 5	0.275 9	*Si*
la05	593	593.000 0	0.000 0	2.894 3	NaN	*Si*
la06	926	926.000 0	0.000 0	4.191 0	NaN	*Si*
la29	1260	1 298.633 3	32.012 0	11.259 6	0.271 1	*Si*
mt06	55	55.200 0	0.600 0	2.111 3	0.150 0	*No*
mt10	969	1 027.833 3	29.481 2	5.551 9	0.283 4	*Si*
mt20	1194	1 247.466 7	34.715 7	5.470 1	0.276 3	*Si*
orb1	1106	1 169.966 7	31.583 2	5.575 4	0.273 7	*Si*
orb2	914	936.166 7	15.782 0	5.521 1	0.278 8	*Si*
orb3	1044	1 135.200 0	36.036 5	5.393 8	0.268 4	*Si*
orb4	1021	1 058.366 7	21.854 8	5.408 9	0.259 2	*No*
orb5	928	980.766 7	30.097 3	5.366 5	0.285 2	*Si*

Table 11: P_C =0.8, P_M =0.1, $\#Individuos = 50$

2.12 Caso 12:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1248	1 287.700 0	30.659 6	5.234 3	0.279 5	*Si*
abz6	943	972.366 7	16.428 6	5.453 3	0.280 0	*Si*
abz7	726	764.466 7	21.794 1	15.945 5	0.281 7	*Si*
abz8	745	778.166 7	18.701 3	16.130 9	0.284 2	*Si*
abz9	766	799.300 0	15.451 3	15.587 6	0.280 9	*Si*
la01	666	667.400 0	4.386 3	2.723 4	0.140 1	*No*
la02	655	665.666 7	8.375 9	2.688 1	0.281 2	*Si*
la03	597	615.866 7	12.945 4	2.634 1	0.278 4	*Si*
la04	590	603.400 0	7.688 1	2.799 2	0.278 8	*Si*
la05	593	593.000 0	0.000 0	2.737 1	NaN	*Si*
la06	926	926.000 0	0.000 0	4.104 0	NaN	*Si*
la29	1254	1 309.800 0	29.871 3	10.551 6	0.285 6	*Si*
mt06	55	55.000 0	0.000 0	1.951 2	NaN	*Si*
mt10	976	1 028.766 7	26.720 4	5.066 2	0.275 5	*Si*
mt20	1182	1 254.100 0	37.986 3	4.982 8	0.259 5	*No*
orb1	1121	1 172.866 7	30.421 2	5.232 4	0.287 6	*No*
orb2	909	938.066 7	17.196 8	5.258 8	0.278 3	*Si*
orb3	1064	1 134.033 3	36.573 7	5.098 4	0.276 5	*Si*
orb4	1026	1 056.533 3	15.478 4	5.186 8	0.279 7	*Si*
orb5	909	963.433 3	26.141 5	5.206 8	0.285 0	*Si*

Table 12: P_C =0.7, P_M =0.01, $\#Individuos = 100$

2.13 Caso 13:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1244	1 280.766 7	22.156 5	5.466 3	0.280 4	*Si*
abz6	943	971.066 7	17.274 1	5.643 4	0.280 5	*Si*
abz7	724	757.866 7	16.814 1	17.080 9	0.284 7	*Si*
abz8	740	772.433 3	19.236 6	17.008 1	0.281 8	*Si*
abz9	776	805.333 3	15.098 2	16.427 0	0.274 1	*Si*
la01	666	673.366 7	10.913 2	2.748 8	0.238 1	*No*
la02	655	671.366 7	12.098 2	2.753 2	0.258 9	*No*
la03	603	617.466 7	8.413 2	2.758 9	0.274 2	*Si*
la04	590	600.133 3	7.112 1	3.058 5	0.276 2	*Si*
la05	593	593.000 0	0.000 0	2.776 5	NaN	*Si*
la06	926	926.000 0	0.000 0	4.002 9	NaN	*Si*
la29	1237	1 311.666 7	28.217 4	10.975 2	0.274 8	*Si*
mt06	55	55.066 7	0.359 0	2.188 8	0.089 8	*No*
mt10	976	1 020.766 7	21.856 6	5.576 5	0.284 4	*Si*
mt20	1188	1 250.366 7	29.372 9	5.320 4	0.283 2	*Si*
orb1	1090	1 151.233 3	31.883 8	5.382 0	0.279 4	*Si*
orb2	890	940.300 0	22.568 6	5.773 4	0.277 8	*Si*
orb3	1065	1 124.066 7	31.978 0	5.486 3	0.282 0	*Si*
orb4	1012	1 062.333 3	23.990 7	5.569 9	0.281 0	*Si*
orb5	905	976.500 0	36.360 9	5.556 0	0.277 4	*Si*

Table 13: P_C =0.8, P_M =0.01, $\#Individuos = 100$

2.14 Caso 14:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1245	1 282.566 7	23.808 5	5.145 3	0.275 9	*Si*
abz6	943	973.366 7	20.519 1	5.312 6	0.275 1	*Si*
abz7	738	770.400 0	15.959 5	16.097 3	0.281 2	*Si*
abz8	728	772.533 3	15.869 7	19.181 9	0.275 5	*Si*
abz9	782	811.233 3	17.073 7	16.170 9	0.282 5	*Si*
la01	666	671.533 3	9.333 6	2.756 8	0.221 5	*No*
la02	655	665.933 3	8.929 1	2.757 6	0.258 8	*No*
la03	597	618.100 0	9.937 6	2.750 7	0.269 7	*Si*
la04	590	600.966 7	9.502 6	2.761 2	0.256 9	*No*
la05	593	593.000 0	0.000 0	2.744 1	NaN	*Si*
la06	926	926.000 0	0.000 0	3.975 9	NaN	*Si*
la29	1264	1 314.500 0	26.159 4	10.458 9	0.282 2	*Si*
mt06	55	55.100 0	0.538 5	2.054 5	0.089 8	*No*
mt10	971	1 028.533 3	25.464 7	5.289 9	0.282 2	*Si*
mt20	1178	1 246.766 7	33.681 5	5.214 6	0.281 0	*Si*
orb1	1113	1 156.300 0	25.158 4	6.137 3	0.281 7	*Si*
orb2	902	934.566 7	16.156 9	6.125 9	0.281 2	*Si*
orb3	1065	1 134.733 3	46.897 7	5.382 4	0.277 6	*Si*
orb4	1024	1 059.400 0	21.769 4	5.287 9	0.275 1	*Si*
orb5	901	970.966 7	30.303 4	5.397 2	0.279 7	*Si*

Table 14: P_C =0.6, P_M =0.05, $\#Individuos = 100$

2.15 Caso 15:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1240	1 286.433 3	24.208 4	5.669 3	0.270 4	*Si*
abz6	945	970.666 7	19.838 2	5.771 3	0.280 3	*Si*
abz7	728	757.566 7	14.916 8	17.271 9	0.281 0	*Si*
abz8	744	775.633 3	14.140 9	17.620 9	0.279 8	*Si*
abz9	776	811.300 0	17.094 2	16.690 3	0.284 9	*Si*
la01	666	670.366 7	7.180 9	2.817 2	0.227 4	*No*
la02	655	667.000 0	11.980 5	2.808 6	0.240 4	*No*
la03	597	615.266 7	11.275 1	2.832 4	0.271 5	*Si*
la04	590	602.733 3	7.650 4	2.822 7	0.280 9	*Si*
la05	593	593.000 0	0.000 0	2.818 3	NaN	*Si*
la06	926	926.000 0	0.000 0	4.081 5	NaN	*Si*
la29	1259	1 321.000 0	36.370 3	10.783 7	0.284 9	*Si*
mt06	55	55.066 7	0.359 0	2.630 0	0.089 8	*No*
mt10	975	1 036.133 3	31.876 6	5.430 1	0.283 5	*Si*
mt20	1204	1 252.366 7	31.292 7	5.328 9	0.274 9	*Si*
orb1	1111	1 159.766 7	31.275 9	5.476 7	0.275 1	*Si*
orb2	900	936.066 7	19.134 5	5.508 8	0.271 3	*Si*
orb3	1070	1 137.966 7	30.285 8	6.277 6	0.277 5	*Si*
orb4	1030	1 057.666 7	17.686 8	5.476 1	0.281 0	*Si*
orb5	904	967.433 3	33.135 8	5.539 9	0.284 3	*Si*

Table 15: P_C =0.7, P_M =0.05, $\#Individuos = 100$

2.16 Caso 16:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1244	1 288.533 3	22.236 2	5.456 5	0.273 0	*Si*
abz6	947	975.333 3	16.914 2	5.607 7	0.284 4	*Si*
abz7	741	762.400 0	15.003 6	16.809 4	0.280 2	*Si*
abz8	753	773.666 7	13.211 9	16.806 0	0.283 6	*Si*
abz9	768	804.400 0	19.137 4	16.479 2	0.283 4	*Si*
la01	666	670.800 0	8.565 0	2.862 7	0.216 9	*No*
la02	655	667.900 0	9.627 6	2.871 4	0.261 7	*No*
la03	597	616.100 0	11.936 9	2.760 7	0.271 5	*Si*
la04	590	601.233 3	8.313 4	2.771 9	0.280 5	*Si*
la05	593	593.000 0	0.000 0	2.868 8	NaN	*Si*
la06	926	926.000 0	0.000 0	4.229 1	NaN	*Si*
la29	1269	1 318.400 0	24.789 2	10.658 3	0.278 2	*Si*
mt06	55	55.066 7	0.359 0	2.130 6	0.089 8	*No*
mt10	943	1 028.833 3	34.331 8	5.525 2	0.279 3	*Si*
mt20	1202	1 252.966 7	30.905 8	5.293 9	0.271 9	*Si*
orb1	1118	1 169.533 3	27.466 0	5.356 5	0.286 5	*Si*
orb2	893	931.700 0	20.576 9	5.403 8	0.284 9	*Si*
orb3	1068	1 135.566 7	34.591 6	5.524 6	0.275 5	*Si*
orb4	1025	1 060.833 3	20.451 7	5.591 4	0.285 8	*Si*
orb5	915	979.300 0	34.874 2	5.393 8	0.278 8	*Si*

Table 16: P_C =0.8, P_M =0.05, $\#Individuos = 100$

2.17 Caso 17:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1244	1 280.900 0	24.897 6	4.790 5	0.283 4	*Si*
abz6	947	973.733 3	14.573 8	4.926 5	0.263 1	*No*
abz7	729	763.566 7	19.415 9	15.087 3	0.280 1	*Si*
abz8	748	772.366 7	14.281 7	14.757 4	0.285 3	*Si*
abz9	780	809.266 7	16.810 6	15.167 4	0.281 6	*Si*
la01	666	669.633 3	7.512 1	2.572 9	0.195 2	*No*
la02	655	664.866 7	7.671 3	2.563 4	0.272 7	*Si*
la03	597	615.366 7	9.806 4	2.505 6	0.272 0	*Si*
la04	590	603.066 7	9.423 1	2.479 7	0.272 3	*Si*
la05	593	593.000 0	0.000 0	2.473 0	NaN	*Si*
la06	926	926.000 0	0.000 0	3.578 2	NaN	*Si*
la29	1240	1 317.400 0	34.157 1	9.870 9	0.282 4	*Si*
mt06	55	55.133 3	0.498 9	1.956 2	0.124 7	*No*
mt10	976	1 022.933 3	22.397 8	5.415 1	0.283 2	*Si*
mt20	1178	1 253.000 0	33.842 8	4.923 3	0.261 9	*No*
orb1	1121	1 161.266 7	20.950 6	5.054 7	0.280 4	*Si*
orb2	894	937.400 0	22.040 3	5.082 4	0.280 6	*Si*
orb3	1062	1 135.433 3	37.664 9	5.044 7	0.281 2	*Si*
orb4	1017	1 059.833 3	17.759 7	5.078 1	0.282 4	*Si*
orb5	891	969.766 7	38.721 0	5.178 7	0.284 8	*Si*

Table 17: P_C =0.6, P_M =0.1, $\#Individuos = 100$

2.18 Caso 18:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1238	1 279.933 3	22.697 9	5.312 6	0.282 6	*Si*
abz6	947	971.733 3	17.546 0	5.225 1	0.277 8	*Si*
abz7	739	762.800 0	17.413 4	15.949 1	0.264 9	*No*
abz8	735	775.100 0	16.666 0	15.643 0	0.283 6	*Si*
abz9	771	807.166 7	19.285 7	15.570 3	0.285 0	*Si*
la01	666	669.266 7	7.775 7	2.617 8	0.178 6	*No*
la02	655	667.966 7	8.788 2	2.712 1	0.274 8	*Si*
la03	597	616.466 7	13.283 4	2.767 1	0.277 5	*Si*
la04	590	600.900 0	7.892 4	2.650 6	0.275 0	*Si*
la05	593	593.000 0	0.000 0	2.622 4	NaN	*Si*
la06	926	926.000 0	0.000 0	3.836 9	NaN	*Si*
la29	1261	1 334.200 0	31.162 4	10.038 5	0.280 6	*Si*
mt06	55	55.133 3	0.498 9	2.035 7	0.124 7	*No*
mt10	969	1 029.500 0	27.671 6	5.530 3	0.282 0	*Si*
mt20	1182	1 244.366 7	25.644 3	4.992 9	0.273 8	*Si*
orb1	1133	1 169.266 7	23.292 2	5.245 9	0.284 6	*Si*
orb2	898	933.733 3	25.739 6	5.366 1	0.269 8	*Si*
orb3	1043	1 138.333 3	45.252 9	5.119 2	0.282 2	*Si*
orb4	1012	1 058.066 7	23.487 5	5.075 7	0.277 4	*Si*
orb5	947	984.666 7	24.913 6	5.262 0	0.286 8	*No*

Table 18: P_C =0.7, P_M =0.1, $\#Individuos = 100$

2.19 Caso 19:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1234	1 284.466 7	24.278 6	5.903 1	0.276 0	*Si*
abz6	943	973.500 0	18.288 0	5.788 0	0.281 2	*Si*
abz7	732	760.000 0	14.475 3	18.416 5	0.284 8	*Si*
abz8	752	774.800 0	14.048 5	17.889 9	0.275 9	*Si*
abz9	783	812.833 3	21.136 2	18.599 2	0.273 5	*Si*
la01	666	669.200 0	7.391 0	2.964 2	0.181 5	*No*
la02	655	669.266 7	11.809 4	2.972 7	0.264 9	*No*
la03	603	614.900 0	9.883 8	2.961 0	0.272 1	*Si*
la04	590	602.700 0	7.699 1	2.967 6	0.279 6	*Si*
la05	593	593.000 0	0.000 0	2.944 7	NaN	*Si*
la06	926	926.000 0	0.000 0	4.522 7	NaN	*Si*
la29	1238	1 307.933 3	32.195 2	12.248 1	0.283 1	*Si*
mt06	55	55.233 3	0.715 7	2.195 7	0.148 3	*No*
mt10	976	1 024.066 7	21.102 8	5.766 6	0.277 1	*Si*
mt20	1207	1 264.100 0	33.362 0	5.871 5	0.281 8	*Si*
orb1	1103	1 157.266 7	27.641 7	5.807 1	0.279 7	*Si*
orb2	916	934.166 7	14.147 0	6.248 3	0.251 8	*No*
orb3	1052	1 139.566 7	46.875 5	6.323 6	0.273 1	*Si*
orb4	1022	1 064.033 3	20.054 1	5.810 6	0.280 8	*Si*
orb5	904	953.533 3	29.858 3	5.859 3	0.279 1	*Si*

Table 19: P_C =0.8, P_M =0.1, $\#Individuos = 100$

2.20 Caso 20:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1244	1 294.100 0	28.761 5	5.583 5	0.283 7	*Si*
abz6	951	974.366 7	13.141 5	5.543 4	0.264 3	*No*
abz7	725	760.800 0	17.388 5	16.234 0	0.284 5	*Si*
abz8	754	780.566 7	16.167 2	15.887 6	0.283 5	*Si*
abz9	774	808.933 3	16.447 8	16.028 4	0.275 9	*Si*
la01	666	669.266 7	7.361 8	2.889 6	0.181 7	*No*
la02	655	670.033 3	15.335 1	2.825 5	0.239 6	*No*
la03	597	620.400 0	11.386 0	2.728 3	0.266 9	*Si*
la04	590	600.866 7	7.477 7	2.834 1	0.279 6	*Si*
la05	593	593.000 0	0.000 0	2.828 5	NaN	*Si*
la06	926	926.000 0	0.000 0	4.086 6	NaN	*Si*
la29	1268	1 321.333 3	26.384 8	10.455 9	0.284 9	*Si*
mt06	55	55.166 7	0.636 8	2.094 6	0.123 0	*No*
mt10	963	1 021.233 3	25.458 0	5.359 5	0.270 4	*Si*
mt20	1196	1 254.733 3	32.099 8	5.085 3	0.274 0	*Si*
orb1	1091	1 166.633 3	26.765 0	5.363 7	0.276 6	*Si*
orb2	909	941.566 7	18.541 3	5.369 7	0.285 3	*Si*
orb3	1065	1 129.433 3	44.841 7	5.382 4	0.279 0	*Si*
orb4	1033	1 070.733 3	24.009 6	5.371 0	0.277 7	*Si*
orb5	915	991.133 3	38.799 3	5.370 4	0.282 7	*Si*

Table 20: P_C =0.7, P_M =0.01, $\#Individuos = 200$

2.21 Caso 21:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1249	1 288.533 3	19.464 0	5.684 7	0.279 8	*Si*
abz6	948	974.266 7	17.738 7	5.829 1	0.279 6	*Si*
abz7	740	766.466 7	14.990 5	17.278 1	0.277 6	*Si*
abz8	745	775.000 0	14.413 0	17.274 7	0.284 9	*Si*
abz9	777	813.233 3	21.769 5	17.630 6	0.286 3	*Si*
la01	666	669.900 0	7.687 0	3.109 5	0.204 7	*No*
la02	655	666.933 3	9.204 8	3.048 7	0.276 2	*Si*
la03	597	616.766 7	12.333 4	3.035 6	0.281 3	*Si*
la04	598	605.200 0	5.764 3	3.016 4	0.276 2	*Si*
la05	593	593.000 0	0.000 0	3.053 0	NaN	*Si*
la06	926	926.000 0	0.000 0	4.341 4	NaN	*Si*
la29	1278	1 324.366 7	30.122 5	11.395 9	0.285 1	*Si*
mt06	55	55.000 0	0.000 0	2.265 0	NaN	*Si*
mt10	962	1 033.500 0	34.093 7	5.731 3	0.281 0	*Si*
mt20	1196	1 258.666 7	39.179 4	5.806 5	0.277 2	*Si*
orb1	1114	1 174.066 7	30.639 8	5.737 9	0.285 2	*Si*
orb2	900	936.566 7	15.493 4	5.788 4	0.276 3	*Si*
orb3	1072	1 146.133 3	42.813 3	5.742 7	0.274 6	*Si*
orb4	1033	1 064.133 3	21.914 6	5.754 8	0.280 3	*Si*
orb5	913	968.966 7	30.525 9	5.822 1	0.285 5	*Si*

Table 21: P_C =0.8, P_M =0.01, $\#Individuos = 200$

2.22 Caso 22:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1254	1 289.700 0	25.504 4	5.488 8	0.272 1	*Si*
abz6	943	969.866 7	18.835 7	5.417 8	0.267 2	*Si*
abz7	736	764.933 3	14.479 7	19.183 3	0.281 2	*Si*
abz8	758	780.933 3	15.329 6	15.859 4	0.276 2	*Si*
abz9	779	812.666 7	19.851 7	16.017 0	0.284 3	*Si*
la01	666	669.566 7	7.088 4	2.793 4	0.204 0	*No*
la02	655	670.300 0	11.981 0	2.805 4	0.254 1	*No*
la03	603	619.100 0	9.360 7	2.778 7	0.272 4	*Si*
la04	590	602.633 3	7.993 7	3.004 8	0.282 4	*Si*
la05	593	593.000 0	0.000 0	2.771 5	NaN	*Si*
la06	926	926.000 0	0.000 0	3.967 1	NaN	*Si*
la29	1256	1 313.166 7	32.485 0	10.235 4	0.277 8	*Si*
mt06	55	55.066 7	0.359 0	2.083 4	0.089 8	*No*
mt10	953	1 029.566 7	33.765 5	5.810 3	0.284 1	*Si*
mt20	1198	1 259.700 0	37.216 6	5.660 9	0.279 1	*Si*
orb1	1106	1 166.866 7	26.117 3	6.531 1	0.282 5	*Si*
orb2	902	944.033 3	23.225 7	5.631 8	0.277 8	*Si*
orb3	1060	1 149.800 0	46.247 5	5.558 8	0.278 5	*Si*
orb4	1029	1 059.766 7	22.697 6	5.520 7	0.269 5	*Si*
orb5	926	980.333 3	35.047 0	5.489 0	0.276 4	*Si*

Table 22: P_C =0.6, P_M =0.05, $\#Individuos = 200$

2.23 Caso 23:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1239	1 290.133 3	35.248 4	5.524 9	0.261 4	*No*
abz6	943	977.933 3	17.678 5	5.745 0	0.275 6	*Si*
abz7	728	770.333 3	18.456 0	17.451 9	0.279 8	*Si*
abz8	753	778.233 3	15.632 6	18.286 1	0.279 8	*Si*
abz9	777	812.500 0	21.222 2	17.808 9	0.258 8	*No*
la01	666	671.766 7	8.762 4	3.001 8	0.236 4	*No*
la02	655	667.400 0	9.769 3	3.312 6	0.247 5	*No*
la03	597	619.966 7	8.158 8	2.922 3	0.262 1	*No*
la04	590	598.433 3	7.437 2	2.946 1	0.267 1	*Si*
la05	593	593.000 0	0.000 0	2.952 2	NaN	*Si*
la06	926	926.000 0	0.000 0	4.413 5	NaN	*Si*
la29	1272	1 333.600 0	29.603 6	10.883 8	0.277 1	*Si*
mt06	55	55.000 0	0.000 0	2.185 9	NaN	*Si*
mt10	967	1 030.266 7	30.159 5	5.678 9	0.284 2	*Si*
mt20	1200	1 256.933 3	25.446 6	5.526 7	0.282 5	*Si*
orb1	1099	1 155.600 0	31.257 6	5.551 7	0.284 1	*Si*
orb2	901	942.033 3	24.915 2	5.570 8	0.280 0	*Si*
orb3	1064	1 124.700 0	39.633 4	5.535 7	0.278 7	*Si*
orb4	1019	1 064.433 3	23.686 4	5.604 5	0.281 3	*Si*
orb5	927	986.366 7	28.741 9	5.562 2	0.279 8	*Si*

Table 23: P_C =0.7, P_M =0.05, $\#Individuos = 200$

2.24 Caso 24:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1249	1 287.633 3	25.334 4	6.044 1	0.269 4	*Si*
abz6	947	973.966 7	16.920 4	6.011 6	0.284 1	*Si*
abz7	726	769.000 0	17.942 5	19.612 5	0.280 4	*Si*
abz8	735	778.300 0	18.954 6	19.045 8	0.282 0	*Si*
abz9	765	813.866 7	21.200 2	19.302 5	0.279 2	*Si*
la01	666	668.600 0	6.601 0	3.205 1	0.171 7	*No*
la02	655	665.966 7	7.082 8	3.307 9	0.282 9	*Si*
la03	597	619.733 3	14.968 7	3.191 8	0.257 9	*No*
la04	590	602.400 0	9.652 6	3.226 5	0.264 3	*No*
la05	593	593.000 0	0.000 0	3.307 3	NaN	*Si*
la06	926	926.000 0	0.000 0	4.462 0	NaN	*Si*
la29	1217	1 318.533 3	30.325 7	11.834 9	0.257 8	*No*
mt06	55	55.166 7	0.636 8	2.376 2	0.123 0	*No*
mt10	982	1 031.466 7	32.882 3	6.088 5	0.277 0	*Si*
mt20	1190	1 249.466 7	23.259 0	6.037 3	0.281 5	*Si*
orb1	1108	1 167.266 7	32.930 2	5.982 4	0.283 3	*Si*
orb2	911	935.700 0	15.282 1	5.955 7	0.280 9	*Si*
orb3	1039	1 135.700 0	34.760 3	6.039 7	0.277 1	*Si*
orb4	1043	1 067.200 0	18.501 2	5.973 7	0.255 4	*No*
orb5	914	974.966 7	33.970 1	6.202 0	0.285 8	*Si*

Table 24: P_C =0.8, P_M =0.05, $\#Individuos = 200$

2.25 Caso 25:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1242	1 292.133 3	25.151 2	5.264 4	0.278 4	*Si*
abz6	945	982.733 3	22.538 8	5.841 5	0.285 9	*Si*
abz7	729	764.566 7	18.672 1	16.259 3	0.283 4	*Si*
abz8	750	783.200 0	20.341 1	15.961 7	0.266 0	*No*
abz9	779	816.366 7	17.482 3	16.303 9	0.276 8	*Si*
la01	666	668.400 0	6.550 3	2.759 4	0.161 1	*No*
la02	655	669.333 3	13.369 9	2.804 0	0.257 0	*No*
la03	597	617.966 7	11.473 1	2.806 9	0.281 1	*Si*
la04	590	602.500 0	8.118 9	3.262 7	0.281 6	*Si*
la05	593	593.000 0	0.000 0	2.762 7	NaN	*Si*
la06	926	926.000 0	0.000 0	3.961 9	NaN	*Si*
la29	1265	1 321.366 7	30.698 0	10.431 6	0.284 8	*Si*
mt06	55	55.066 7	0.359 0	2.101 2	0.089 8	*No*
mt10	967	1 022.966 7	25.948 0	5.305 2	0.270 4	*Si*
mt20	1198	1 261.966 7	42.740 7	5.576 7	0.285 3	*Si*
orb1	1088	1 164.600 0	36.965 4	5.273 1	0.275 8	*Si*
orb2	891	936.100 0	20.098 7	5.306 8	0.274 0	*Si*
orb3	1061	1 137.766 7	44.450 5	5.188 1	0.287 3	*No*
orb4	1012	1 053.800 0	24.666 3	5.209 0	0.267 2	*Si*
orb5	912	977.400 0	38.152 9	5.211 9	0.276 3	*Si*

Table 25: P_C =0.6, P_M =0.1, $\#Individuos = 200$

2.26 Caso 26:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1242	1 285.833 3	22.936 3	5.564 8	0.281 5	*Si*
abz6	943	971.233 3	20.039 4	5.672 4	0.274 4	*Si*
abz7	719	763.833 3	20.618 9	16.883 4	0.277 6	*Si*
abz8	739	783.866 7	22.378 2	16.889 8	0.281 3	*Si*
abz9	761	807.500 0	21.419 2	16.828 2	0.283 7	*Si*
la01	666	669.500 0	7.570 8	2.914 4	0.192 5	*No*
la02	655	666.733 3	11.395 7	2.916 7	0.262 9	*No*
la03	603	619.133 3	11.760 8	2.918 1	0.276 3	*Si*
la04	593	603.066 7	6.747 5	2.920 6	0.279 6	*Si*
la05	593	593.000 0	0.000 0	2.932 6	NaN	*Si*
la06	926	926.000 0	0.000 0	4.196 8	NaN	*Si*
la29	1250	1 320.633 3	35.314 3	10.896 8	0.282 7	*Si*
mt06	55	55.000 0	0.000 0	2.202 4	NaN	*Si*
mt10	997	1 032.266 7	18.978 8	5.520 3	0.284 0	*Si*
mt20	1205	1 262.833 3	31.573 3	5.458 4	0.272 4	*Si*
orb1	1113	1 167.766 7	24.825 6	5.545 3	0.282 2	*Si*
orb2	903	944.866 7	24.369 0	5.557 6	0.267 9	*Si*
orb3	1058	1 121.300 0	30.371 2	5.549 2	0.282 3	*Si*
orb4	1012	1 063.600 0	27.029 1	5.574 4	0.270 2	*Si*
orb5	934	989.633 3	32.895 3	5.573 3	0.283 0	*Si*

Table 26: P_C =0.7, P_M =0.1, $\#Individuos = 200$

2.27 Caso 27:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1249	1 283.700 0	20.776 8	5.873 3	0.286 6	*No*
abz6	945	973.800 0	17.799 6	5.507 7	0.277 8	*Si*
abz7	740	769.366 7	18.513 9	16.850 5	0.286 7	*No*
abz8	746	776.700 0	14.724 5	17.451 8	0.267 2	*Si*
abz9	787	814.566 7	14.952 6	17.125 8	0.272 2	*Si*
la01	666	670.000 0	8.445 9	2.871 1	0.194 7	*No*
la02	655	667.000 0	8.725 4	2.897 8	0.279 6	*Si*
la03	597	619.600 0	11.614 9	2.882 9	0.281 1	*Si*
la04	590	606.366 7	8.420 1	2.876 8	0.266 6	*Si*
la05	593	593.000 0	0.000 0	2.879 4	NaN	*Si*
la06	926	926.000 0	0.000 0	4.155 2	NaN	*Si*
la29	1261	1 326.833 3	34.414 2	10.807 8	0.277 2	*Si*
mt06	55	55.100 0	0.538 5	2.156 9	0.089 8	*No*
mt10	1002	1 029.600 0	17.566 3	5.472 5	0.271 5	*Si*
mt20	1188	1 259.133 3	28.760 8	5.391 4	0.270 3	*Si*
orb1	1104	1 162.866 7	27.361 4	5.482 5	0.278 4	*Si*
orb2	898	939.433 3	22.127 9	5.516 2	0.281 6	*Si*
orb3	1079	1 146.166 7	33.224 6	5.467 2	0.278 4	*Si*
orb4	1017	1 056.500 0	20.276 0	5.496 6	0.281 3	*Si*
orb5	919	963.233 3	27.165 8	5.503 8	0.285 9	*Si*

Table 27: P_C =0.8, P_M =0.1, $\#Individuos = 200$

3 CHC

3.1 Caso 1:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1401	1 459.800 0	35.051 8	11.064 0	0.283 0	*Si*
abz6	1019	1 066.900 0	21.606 1	10.787 6	0.281 3	*Si*
abz7	950	986.066 7	20.013 2	131.034 8	0.281 9	*Si*
abz8	949	1 006.266 7	21.831 1	129.557 5	0.277 7	*Si*
abz9	961	1 013.766 7	22.309 5	123.642 9	0.259 9	*No*
la01	688	705.333 3	16.706 0	2.352 0	0.250 9	*No*
la02	666	695.200 0	16.545 7	2.270 1	0.274 3	*Si*
la03	630	661.566 7	15.430 9	2.349 6	0.282 6	*Si*
la04	613	653.900 0	23.354 3	2.266 4	0.282 4	*Si*
la05	593	593.000 0	0.000 0	2.446 5	NaN	*Si*
la06	926	936.300 0	10.289 6	4.460 9	0.266 3	*Si*
la29	1471	1 606.200 0	43.171 3	39.758 9	0.273 1	*Si*
mt06	55	55.566 7	0.919 5	1.502 1	0.230 2	*No*
mt10	1114	1 186.633 3	27.183 9	10.541 6	0.275 9	*Si*
mt20	1407	1 460.200 0	32.086 8	7.035 3	0.271 7	*Si*
orb1	1285	1 343.300 0	29.196 1	10.703 0	0.283 7	*Si*
orb2	1015	1 058.766 7	29.216 1	10.799 3	0.275 2	*Si*
orb3	1225	1 310.600 0	42.320 7	10.499 3	0.283 3	*Si*
orb4	1136	1 200.400 0	30.465 9	10.661 6	0.283 9	*Si*
orb5	1075	1 131.933 3	36.697 8	10.460 4	0.286 3	*Si*

Table 28: P_C =0.6, $\#Individuos = 50$

3.2 Caso 2:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1366	1 429.233 3	29.108 6	20.907 9	0.280 6	*Si*
abz6	991	1 047.633 3	25.453 9	20.445 0	0.280 6	*Si*
abz7	912	955.400 0	19.853 8	258.749 2	0.282 6	*Si*
abz8	935	974.633 3	17.211 4	251.367 5	0.280 1	*Si*
abz9	931	986.333 3	23.850 0	247.559 5	0.281 9	*Si*
la01	688	698.766 7	10.852 6	4.405 3	0.192 5	*No*
la02	664	682.533 3	17.348 8	4.294 2	0.272 3	*Si*
la03	617	648.300 0	14.633 6	4.375 0	0.281 4	*Si*
la04	613	650.733 3	20.972 9	4.306 1	0.281 5	*Si*
la05	593	593.000 0	0.000 0	4.711 8	NaN	*Si*
la06	926	927.166 7	1.881 2	8.495 7	0.227 7	*No*
la29	1501	1 568.466 7	37.871 5	75.585 5	0.287 5	*No*
mt06	55	55.133 3	0.426 9	3.067 4	0.143 2	*No*
mt10	1076	1 140.333 3	25.530 8	20.969 4	0.281 4	*Si*
mt20	1383	1 425.900 0	25.575 2	13.562 6	0.278 6	*Si*
orb1	1239	1 305.500 0	39.689 4	20.937 8	0.278 6	*Si*
orb2	950	1 024.600 0	34.891 8	20.708 4	0.274 6	*Si*
orb3	1225	1 280.200 0	35.853 8	20.710 7	0.284 7	*Si*
orb4	1120	1 180.766 7	29.903 9	20.995 5	0.285 6	*Si*
orb5	1040	1 107.500 0	35.008 3	21.352 2	0.273 7	*Si*

Table 29: P_C =0.6, $\#Individuos = 100$

3.3 Caso 3:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 404.833 3	27.349 7	40.971 9	0.279 7	*Si*
abz6	976	1 015.866 7	24.902 1	40.646 9	0.280 5	*Si*
abz7	897	929.566 7	16.742 5	510.979 5	0.283 1	*Si*
abz8	908	946.200 0	19.530 1	503.741 5	0.284 1	*Si*
abz9	912	949.566 7	20.571 3	489.697 6	0.286 5	*Si*
la01	688	695.266 7	7.580 4	8.945 2	0.140 9	*No*
la02	664	672.566 7	9.478 7	8.689 2	0.245 6	*No*
la03	635	643.500 0	9.236 7	8.764 6	0.266 6	*Si*
la04	613	641.666 7	17.428 6	8.864 3	0.285 6	*Si*
la05	593	593.000 0	0.000 0	9.632 7	NaN	*Si*
la06	926	926.366 7	1.016 0	17.804 6	0.161 3	*No*
la29	1445	1 508.166 7	35.318 6	148.166 1	0.279 4	*Si*
mt06	55	55.033 3	0.179 5	6.169 1	0.089 8	*No*
mt10	1077	1 121.766 7	27.572 6	42.207 7	0.283 4	*Si*
mt20	1341	1 411.100 0	28.670 9	26.394 8	0.281 5	*Si*
orb1	1183	1 265.766 7	26.318 2	40.512 3	0.270 7	*Si*
orb2	957	1 002.400 0	26.730 3	41.082 2	0.276 5	*Si*
orb3	1173	1 244.500 0	34.390 6	39.885 7	0.284 4	*Si*
orb4	1117	1 150.100 0	19.620 3	41.016 2	0.280 9	*Si*
orb5	1033	1 080.166 7	23.983 4	41.315 2	0.285 5	*Si*

Table 30: P_C =0.6, $\#Individuos = 200$

3.4 Caso 4:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 445.933 3	33.415 5	11.280 3	0.282 0	*Si*
abz6	990	1 063.900 0	31.593 6	10.856 4	0.277 4	*Si*
abz7	934	976.933 3	18.262 8	130.759 6	0.268 4	*Si*
abz8	958	1 003.133 3	18.638 2	133.024 1	0.283 9	*Si*
abz9	960	1 018.733 3	28.383 0	129.749 9	0.281 3	*Si*
la01	688	698.800 0	10.821 0	2.298 9	0.229 2	*No*
la02	666	699.733 3	15.292 6	2.315 0	0.280 7	*Si*
la03	635	655.266 7	13.913 9	2.338 9	0.280 1	*Si*
la04	622	657.400 0	21.523 0	2.346 4	0.286 9	*No*
la05	593	593.000 0	0.000 0	2.490 3	NaN	*Si*
la06	926	937.033 3	11.951 2	4.748 4	0.267 1	*Si*
la29	1520	1 620.000 0	38.523 6	40.363 8	0.279 9	*Si*
mt06	55	55.633 3	0.982 6	1.537 9	0.234 6	*No*
mt10	1123	1 186.666 7	32.953 8	10.701 9	0.282 3	*Si*
mt20	1416	1 468.433 3	28.867 1	6.986 2	0.286 7	*No*
orb1	1252	1 330.666 7	36.213 6	10.698 2	0.281 5	*Si*
orb2	988	1 064.600 0	38.086 4	11.071 5	0.284 8	*Si*
orb3	1224	1 309.200 0	38.485 8	10.877 0	0.282 2	*Si*
orb4	1139	1 211.366 7	37.220 5	10.788 1	0.284 5	*Si*
orb5	1049	1 127.633 3	41.789 5	10.549 5	0.277 4	*Si*

Table 31: P_C =0.7, $\#Individuos = 50$

3.5 Caso 5:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1393	1 463.300 0	24.847 7	11.198 7	0.258 1	*No*
abz6	983	1 063.766 7	30.599 2	10.663 5	0.276 7	*Si*
abz7	939	983.200 0	23.165 2	132.675 4	0.284 7	*Si*
abz8	956	1 010.300 0	24.529 1	130.708 1	0.280 1	*Si*
abz9	971	1 007.466 7	21.769 6	124.835 0	0.277 1	*Si*
la01	688	707.800 0	18.351 0	2.253 7	0.257 1	*No*
la02	666	696.866 7	24.806 9	2.246 3	0.277 3	*Si*
la03	635	658.166 7	11.980 8	2.243 6	0.281 6	*Si*
la04	613	648.933 3	23.236 4	2.224 4	0.284 2	*Si*
la05	593	593.000 0	0.000 0	2.413 4	NaN	*Si*
la06	926	937.366 7	12.413 7	4.538 7	0.268 7	*Si*
la29	1535	1 616.466 7	33.934 0	38.515 3	0.281 6	*Si*
mt06	55	55.433 3	0.955 1	1.561 5	0.191 4	*No*
mt10	1106	1 169.166 7	27.794 6	10.754 2	0.283 0	*Si*
mt20	1400	1 472.233 3	45.214 1	6.809 4	0.283 8	*Si*
orb1	1206	1 321.633 3	47.574 1	10.449 9	0.279 1	*Si*
orb2	972	1 050.633 3	43.152 0	10.697 5	0.277 7	*Si*
orb3	1242	1 310.266 7	43.714 9	10.336 7	0.286 4	*Si*
orb4	1147	1 209.200 0	34.301 0	10.529 0	0.284 5	*Si*
orb5	1067	1 118.266 7	33.602 5	10.476 9	0.280 5	*Si*

Table 32: P_C =0.8, $\#Individuos = 50$

3.6 Caso 6:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1401	1 459.800 0	35.051 8	11.064 0	0.283 0	*Si*
abz6	1019	1 066.900 0	21.606 1	10.787 6	0.281 3	*Si*
abz7	950	986.066 7	20.013 2	131.034 8	0.281 9	*Si*
abz8	949	1 006.266 7	21.831 1	129.557 5	0.277 7	*Si*
abz9	961	1 013.766 7	22.309 5	123.642 9	0.259 9	*No*
la01	688	705.333 3	16.706 0	2.352 0	0.250 9	*No*
la02	666	695.200 0	16.545 7	2.270 1	0.274 3	*Si*
la03	630	661.566 7	15.430 9	2.349 6	0.282 6	*Si*
la04	613	653.900 0	23.354 3	2.266 4	0.282 4	*Si*
la05	593	593.000 0	0.000 0	2.446 5	NaN	*Si*
la06	926	936.300 0	10.289 6	4.460 9	0.266 3	*Si*
la29	1471	1 606.200 0	43.171 3	39.758 9	0.273 1	*Si*
mt06	55	55.566 7	0.919 5	1.502 1	0.230 2	*No*
mt10	1114	1 186.633 3	27.183 9	10.541 6	0.275 9	*Si*
mt20	1407	1 460.200 0	32.086 8	7.035 3	0.271 7	*Si*
orb1	1285	1 343.300 0	29.196 1	10.703 0	0.283 7	*Si*
orb2	1015	1 058.766 7	29.216 1	10.799 3	0.275 2	*Si*
orb3	1225	1 310.600 0	42.320 7	10.499 3	0.283 3	*Si*
orb4	1136	1 200.400 0	30.465 9	10.661 6	0.283 9	*Si*
orb5	1075	1 131.933 3	36.697 8	10.460 4	0.286 3	*Si*

Table 33: P_C =0.6, $\#Individuos = 50$

3.7 Caso 7:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 445.933 3	33.415 5	11.280 3	0.282 0	*Si*
abz6	990	1 063.900 0	31.593 6	10.856 4	0.277 4	*Si*
abz7	934	976.933 3	18.262 8	130.759 6	0.268 4	*Si*
abz8	958	1 003.133 3	18.638 2	133.024 1	0.283 9	*Si*
abz9	960	1 018.733 3	28.383 0	129.749 9	0.281 3	*Si*
la01	688	698.800 0	10.821 0	2.298 9	0.229 2	*No*
la02	666	699.733 3	15.292 6	2.315 0	0.280 7	*Si*
la03	635	655.266 7	13.913 9	2.338 9	0.280 1	*Si*
la04	622	657.400 0	21.523 0	2.346 4	0.286 9	*No*
la05	593	593.000 0	0.000 0	2.490 3	NaN	*Si*
la06	926	937.033 3	11.951 2	4.748 4	0.267 1	*Si*
la29	1520	1 620.000 0	38.523 6	40.363 8	0.279 9	*Si*
mt06	55	55.633 3	0.982 6	1.537 9	0.234 6	*No*
mt10	1123	1 186.666 7	32.953 8	10.701 9	0.282 3	*Si*
mt20	1416	1 468.433 3	28.867 1	6.986 2	0.286 7	*No*
orb1	1252	1 330.666 7	36.213 6	10.698 2	0.281 5	*Si*
orb2	988	1 064.600 0	38.086 4	11.071 5	0.284 8	*Si*
orb3	1224	1 309.200 0	38.485 8	10.877 0	0.282 2	*Si*
orb4	1139	1 211.366 7	37.220 5	10.788 1	0.284 5	*Si*
orb5	1049	1 127.633 3	41.789 5	10.549 5	0.277 4	*Si*

Table 34: P_C =0.7, $\#Individuos = 50$

3.8 Caso 8:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1393	1 463.300 0	24.847 7	11.198 7	0.258 1	*No*
abz6	983	1 063.766 7	30.599 2	10.663 5	0.276 7	*Si*
abz7	939	983.200 0	23.165 2	132.675 4	0.284 7	*Si*
abz8	956	1 010.300 0	24.529 1	130.708 1	0.280 1	*Si*
abz9	971	1 007.466 7	21.769 6	124.835 0	0.277 1	*Si*
la01	688	707.800 0	18.351 0	2.253 7	0.257 1	*No*
la02	666	696.866 7	24.806 9	2.246 3	0.277 3	*Si*
la03	635	658.166 7	11.980 8	2.243 6	0.281 6	*Si*
la04	613	648.933 3	23.236 4	2.224 4	0.284 2	*Si*
la05	593	593.000 0	0.000 0	2.413 4	NaN	*Si*
la06	926	937.366 7	12.413 7	4.538 7	0.268 7	*Si*
la29	1535	1 616.466 7	33.934 0	38.515 3	0.281 6	*Si*
mt06	55	55.433 3	0.955 1	1.561 5	0.191 4	*No*
mt10	1106	1 169.166 7	27.794 6	10.754 2	0.283 0	*Si*
mt20	1400	1 472.233 3	45.214 1	6.809 4	0.283 8	*Si*
orb1	1206	1 321.633 3	47.574 1	10.449 9	0.279 1	*Si*
orb2	972	1 050.633 3	43.152 0	10.697 5	0.277 7	*Si*
orb3	1242	1 310.266 7	43.714 9	10.336 7	0.286 4	*Si*
orb4	1147	1 209.200 0	34.301 0	10.529 0	0.284 5	*Si*
orb5	1067	1 118.266 7	33.602 5	10.476 9	0.280 5	*Si*

Table 35: P_C =0.8, $\#Individuos = 50$

3.9 Caso 9:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1401	1 459.800 0	35.051 8	11.064 0	0.283 0	*Si*
abz6	1019	1 066.900 0	21.606 1	10.787 6	0.281 3	*Si*
abz7	950	986.066 7	20.013 2	131.034 8	0.281 9	*Si*
abz8	949	1 006.266 7	21.831 1	129.557 5	0.277 7	*Si*
abz9	961	1 013.766 7	22.309 5	123.642 9	0.259 9	*No*
la01	688	705.333 3	16.706 0	2.352 0	0.250 9	*No*
la02	666	695.200 0	16.545 7	2.270 1	0.274 3	*Si*
la03	630	661.566 7	15.430 9	2.349 6	0.282 6	*Si*
la04	613	653.900 0	23.354 3	2.266 4	0.282 4	*Si*
la05	593	593.000 0	0.000 0	2.446 5	NaN	*Si*
la06	926	936.300 0	10.289 6	4.460 9	0.266 3	*Si*
la29	1471	1 606.200 0	43.171 3	39.758 9	0.273 1	*Si*
mt06	55	55.566 7	0.919 5	1.502 1	0.230 2	*No*
mt10	1114	1 186.633 3	27.183 9	10.541 6	0.275 9	*Si*
mt20	1407	1 460.200 0	32.086 8	7.035 3	0.271 7	*Si*
orb1	1285	1 343.300 0	29.196 1	10.703 0	0.283 7	*Si*
orb2	1015	1 058.766 7	29.216 1	10.799 3	0.275 2	*Si*
orb3	1225	1 310.600 0	42.320 7	10.499 3	0.283 3	*Si*
orb4	1136	1 200.400 0	30.465 9	10.661 6	0.283 9	*Si*
orb5	1075	1 131.933 3	36.697 8	10.460 4	0.286 3	*Si*

Table 36: P_C =0.6, $\#Individuos = 50$

3.10 Caso 10:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 445.933 3	33.415 5	11.280 3	0.282 0	*Si*
abz6	990	1 063.900 0	31.593 6	10.856 4	0.277 4	*Si*
abz7	934	976.933 3	18.262 8	130.759 6	0.268 4	*Si*
abz8	958	1 003.133 3	18.638 2	133.024 1	0.283 9	*Si*
abz9	960	1 018.733 3	28.383 0	129.749 9	0.281 3	*Si*
la01	688	698.800 0	10.821 0	2.298 9	0.229 2	*No*
la02	666	699.733 3	15.292 6	2.315 0	0.280 7	*Si*
la03	635	655.266 7	13.913 9	2.338 9	0.280 1	*Si*
la04	622	657.400 0	21.523 0	2.346 4	0.286 9	*No*
la05	593	593.000 0	0.000 0	2.490 3	NaN	*Si*
la06	926	937.033 3	11.951 2	4.748 4	0.267 1	*Si*
la29	1520	1 620.000 0	38.523 6	40.363 8	0.279 9	*Si*
mt06	55	55.633 3	0.982 6	1.537 9	0.234 6	*No*
mt10	1123	1 186.666 7	32.953 8	10.701 9	0.282 3	*Si*
mt20	1416	1 468.433 3	28.867 1	6.986 2	0.286 7	*No*
orb1	1252	1 330.666 7	36.213 6	10.698 2	0.281 5	*Si*
orb2	988	1 064.600 0	38.086 4	11.071 5	0.284 8	*Si*
orb3	1224	1 309.200 0	38.485 8	10.877 0	0.282 2	*Si*
orb4	1139	1 211.366 7	37.220 5	10.788 1	0.284 5	*Si*
orb5	1049	1 127.633 3	41.789 5	10.549 5	0.277 4	*Si*

Table 37: P_C =0.7, $\#Individuos = 50$

3.11 Caso 11:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1393	1 463.300 0	24.847 7	11.198 7	0.258 1	*No*
abz6	983	1 063.766 7	30.599 2	10.663 5	0.276 7	*Si*
abz7	939	983.200 0	23.165 2	132.675 4	0.284 7	*Si*
abz8	956	1 010.300 0	24.529 1	130.708 1	0.280 1	*Si*
abz9	971	1 007.466 7	21.769 6	124.835 0	0.277 1	*Si*
la01	688	707.800 0	18.351 0	2.253 7	0.257 1	*No*
la02	666	696.866 7	24.806 9	2.246 3	0.277 3	*Si*
la03	635	658.166 7	11.980 8	2.243 6	0.281 6	*Si*
la04	613	648.933 3	23.236 4	2.224 4	0.284 2	*Si*
la05	593	593.000 0	0.000 0	2.413 4	NaN	*Si*
la06	926	937.366 7	12.413 7	4.538 7	0.268 7	*Si*
la29	1535	1 616.466 7	33.934 0	38.515 3	0.281 6	*Si*
mt06	55	55.433 3	0.955 1	1.561 5	0.191 4	*No*
mt10	1106	1 169.166 7	27.794 6	10.754 2	0.283 0	*Si*
mt20	1400	1 472.233 3	45.214 1	6.809 4	0.283 8	*Si*
orb1	1206	1 321.633 3	47.574 1	10.449 9	0.279 1	*Si*
orb2	972	1 050.633 3	43.152 0	10.697 5	0.277 7	*Si*
orb3	1242	1 310.266 7	43.714 9	10.336 7	0.286 4	*Si*
orb4	1147	1 209.200 0	34.301 0	10.529 0	0.284 5	*Si*
orb5	1067	1 118.266 7	33.602 5	10.476 9	0.280 5	*Si*

Table 38: P_C =0.8, $\#Individuos = 50$

3.12 Caso 12:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 426.033 3	26.994 4	20.913 8	0.274 3	*Si*
abz6	996	1 042.400 0	19.752 8	21.424 7	0.282 4	*Si*
abz7	916	956.033 3	17.461 4	270.409 8	0.280 5	*Si*
abz8	925	978.133 3	22.233 2	263.543 7	0.279 9	*Si*
abz9	911	982.900 0	23.119 0	250.164 2	0.267 6	*Si*
la01	688	698.366 7	12.408 3	4.420 1	0.211 1	*No*
la02	666	686.400 0	17.421 4	4.281 8	0.279 2	*Si*
la03	617	650.200 0	14.164 3	4.378 0	0.279 7	*Si*
la04	613	648.900 0	20.916 3	4.322 7	0.278 9	*Si*
la05	593	593.000 0	0.000 0	4.765 5	NaN	*Si*
la06	926	928.900 0	4.908 2	8.533 2	0.214 0	*No*
la29	1516	1 570.600 0	33.445 1	75.611 9	0.283 2	*Si*
mt06	55	55.100 0	0.395 8	2.999 9	0.119 3	*No*
mt10	1095	1 151.966 7	25.276 4	20.432 3	0.282 8	*Si*
mt20	1328	1 436.300 0	34.282 3	13.329 4	0.271 7	*Si*
orb1	1245	1 300.600 0	33.960 4	20.426 2	0.286 6	*No*
orb2	965	1 022.533 3	29.156 7	20.511 0	0.278 2	*Si*
orb3	1213	1 257.600 0	27.955 4	20.205 6	0.283 3	*Si*
orb4	1105	1 161.766 7	31.560 2	20.545 0	0.280 4	*Si*
orb5	1027	1 096.833 3	35.561 3	20.376 9	0.285 1	*Si*

Table 39: P_C =0.7, $\#Individuos = 100$

3.13 Caso 13:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 421.900 0	26.930 0	20.995 5	0.275 0	Si
abz6	999	1 039.100 0	20.970 4	20.909 5	0.283 4	Si
abz7	910	948.333 3	17.012 4	255.927 1	0.281 6	Si
abz8	927	977.766 7	21.115 1	255.610 9	0.280 1	Si
abz9	945	981.200 0	18.416 3	268.608 1	0.284 2	Si
la01	688	695.633 3	7.622 3	5.368 9	0.215 4	No
la02	664	677.833 3	12.482 2	4.603 3	0.264 4	No
la03	617	649.800 0	13.543 5	4.701 1	0.277 7	Si
la04	618	653.833 3	22.496 0	4.745 8	0.278 8	Si
la05	593	593.000 0	0.000 0	5.227 0	NaN	Si
la06	926	928.466 7	5.713 9	10.247 2	0.167 0	No
la29	1494	1 568.100 0	33.236 9	80.696 1	0.280 3	Si
mt06	55	55.133 3	0.561 7	3.195 0	0.112 7	No
mt10	1102	1 152.033 3	27.658 0	22.776 1	0.279 7	Si
mt20	1366	1 437.200 0	31.534 5	14.481 5	0.279 8	Si
orb1	1240	1 299.766 7	30.320 2	22.058 9	0.285 2	Si
orb2	966	1 015.233 3	28.574 7	22.390 0	0.287 3	No
orb3	1204	1 288.633 3	37.902 1	21.858 9	0.280 7	Si
orb4	1128	1 176.300 0	24.377 8	22.110 3	0.277 4	Si
orb5	1024	1 101.700 0	41.872 1	21.893 6	0.285 7	Si

Table 40: P_C =0.8, $\#Individuos = 100$

3.14 Caso 14:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1366	1 429.233 3	29.108 6	20.907 9	0.280 6	Si
abz6	991	1 047.633 3	25.453 9	20.445 0	0.280 6	Si
abz7	912	955.400 0	19.853 8	258.749 2	0.282 6	Si
abz8	935	974.633 3	17.211 4	251.367 5	0.280 1	Si
abz9	931	986.333 3	23.850 0	247.559 5	0.281 9	Si
la01	688	698.766 7	10.852 6	4.405 3	0.192 5	No
la02	664	682.533 3	17.348 8	4.294 2	0.272 3	Si
la03	617	648.300 0	14.633 6	4.375 0	0.281 4	Si
la04	613	650.733 3	20.972 9	4.306 1	0.281 5	Si
la05	593	593.000 0	0.000 0	4.711 8	NaN	Si
la06	926	927.166 7	1.881 2	8.495 7	0.227 7	No
la29	1501	1 568.466 7	37.871 5	75.585 5	0.287 5	No
mt06	55	55.133 3	0.426 9	3.067 4	0.143 2	No
mt10	1076	1 140.333 3	25.530 8	20.969 4	0.281 4	Si
mt20	1383	1 425.900 0	25.575 2	13.562 6	0.278 6	Si
orb1	1239	1 305.500 0	39.689 4	20.937 8	0.278 6	Si
orb2	950	1 024.600 0	34.891 8	20.708 4	0.274 6	Si
orb3	1225	1 280.200 0	35.853 8	20.710 7	0.284 7	Si
orb4	1120	1 180.766 7	29.903 9	20.995 5	0.285 6	Si
orb5	1040	1 107.500 0	35.008 3	21.352 2	0.273 7	Si

Table 41: P_C =0.6, $\#Individuos = 100$

3.15 Caso 15:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 426.033 3	26.994 4	20.913 8	0.274 3	*Si*
abz6	996	1 042.400 0	19.752 8	21.424 7	0.282 4	*Si*
abz7	916	956.033 3	17.461 4	270.409 8	0.280 5	*Si*
abz8	925	978.133 3	22.233 2	263.543 7	0.279 9	*Si*
abz9	911	982.900 0	23.119 0	250.164 2	0.267 6	*Si*
la01	688	698.366 7	12.408 3	4.420 1	0.211 1	*No*
la02	666	686.400 0	17.421 4	4.281 8	0.279 2	*Si*
la03	617	650.200 0	14.164 3	4.378 0	0.279 7	*Si*
la04	613	648.900 0	20.916 3	4.322 7	0.278 9	*Si*
la05	593	593.000 0	0.000 0	4.765 5	NaN	*Si*
la06	926	928.900 0	4.908 2	8.533 2	0.214 0	*No*
la29	1516	1 570.600 0	33.445 1	75.611 9	0.283 2	*Si*
mt06	55	55.100 0	0.395 8	2.999 9	0.119 3	*No*
mt10	1095	1 151.966 7	25.276 4	20.432 3	0.282 8	*Si*
mt20	1328	1 436.300 0	34.282 3	13.329 4	0.271 7	*Si*
orb1	1245	1 300.600 0	33.960 4	20.426 2	0.286 6	*No*
orb2	965	1 022.533 3	29.156 7	20.511 0	0.278 2	*Si*
orb3	1213	1 257.600 0	27.955 4	20.205 6	0.283 3	*Si*
orb4	1105	1 161.766 7	31.560 2	20.545 0	0.280 4	*Si*
orb5	1027	1 096.833 3	35.561 3	20.376 9	0.285 1	*Si*

Table 42: P_C =0.7, $\#Individuos = 100$

3.16 Caso 16:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 421.900 0	26.930 0	20.995 5	0.275 0	*Si*
abz6	999	1 039.100 0	20.970 4	20.909 5	0.283 4	*Si*
abz7	910	948.333 3	17.012 4	255.927 1	0.281 6	*Si*
abz8	927	977.766 7	21.115 1	255.610 9	0.280 1	*Si*
abz9	945	981.200 0	18.416 3	268.608 1	0.284 2	*Si*
la01	688	695.633 3	7.622 3	5.368 9	0.215 4	*No*
la02	664	677.833 3	12.482 2	4.603 3	0.264 4	*No*
la03	617	649.800 0	13.543 5	4.701 1	0.277 7	*Si*
la04	618	653.833 3	22.496 0	4.745 8	0.278 8	*Si*
la05	593	593.000 0	0.000 0	5.227 0	NaN	*Si*
la06	926	928.466 7	5.713 9	10.247 2	0.167 0	*No*
la29	1494	1 568.100 0	33.236 9	80.696 1	0.280 3	*Si*
mt06	55	55.133 3	0.561 7	3.195 0	0.112 7	*No*
mt10	1102	1 152.033 3	27.658 0	22.776 1	0.279 7	*Si*
mt20	1366	1 437.200 0	31.534 5	14.481 5	0.279 8	*Si*
orb1	1240	1 299.766 7	30.320 2	22.058 9	0.285 2	*Si*
orb2	966	1 015.233 3	28.574 7	22.390 0	0.287 3	*No*
orb3	1204	1 288.633 3	37.902 1	21.858 9	0.280 7	*Si*
orb4	1128	1 176.300 0	24.377 8	22.110 3	0.277 4	*Si*
orb5	1024	1 101.700 0	41.872 1	21.893 6	0.285 7	*Si*

Table 43: P_C =0.8, $\#Individuos = 100$

3.17 Caso 17:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1366	1 429.233 3	29.108 6	20.907 9	0.280 6	*Si*
abz6	991	1 047.633 3	25.453 9	20.445 0	0.280 6	*Si*
abz7	912	955.400 0	19.853 8	258.749 2	0.282 6	*Si*
abz8	935	974.633 3	17.211 4	251.367 5	0.280 1	*Si*
abz9	931	986.333 3	23.850 0	247.559 5	0.281 9	*Si*
la01	688	698.766 7	10.852 6	4.405 3	0.192 5	*No*
la02	664	682.533 3	17.348 8	4.294 2	0.272 3	*Si*
la03	617	648.300 0	14.633 6	4.375 0	0.281 4	*Si*
la04	613	650.733 3	20.972 9	4.306 1	0.281 5	*Si*
la05	593	593.000 0	0.000 0	4.711 8	NaN	*Si*
la06	926	927.166 7	1.881 2	8.495 7	0.227 7	*No*
la29	1501	1 568.466 7	37.871 5	75.585 5	0.287 5	*No*
mt06	55	55.133 3	0.426 9	3.067 4	0.143 2	*No*
mt10	1076	1 140.333 3	25.530 8	20.969 4	0.281 4	*Si*
mt20	1383	1 425.900 0	25.575 2	13.562 6	0.278 6	*Si*
orb1	1239	1 305.500 0	39.689 4	20.937 8	0.278 6	*Si*
orb2	950	1 024.600 0	34.891 8	20.708 4	0.274 6	*Si*
orb3	1225	1 280.200 0	35.853 8	20.710 7	0.284 7	*Si*
orb4	1120	1 180.766 7	29.903 9	20.995 5	0.285 6	*Si*
orb5	1040	1 107.500 0	35.008 3	21.352 2	0.273 7	*Si*

Table 44: P_C =0.6, $\#Individuos = 100$

3.18 Caso 18:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1375	1 426.033 3	26.994 4	20.913 8	0.274 3	*Si*
abz6	996	1 042.400 0	19.752 8	21.424 7	0.282 4	*Si*
abz7	916	956.033 3	17.461 4	270.409 8	0.280 5	*Si*
abz8	925	978.133 3	22.233 2	263.543 7	0.279 9	*Si*
abz9	911	982.900 0	23.119 0	250.164 2	0.267 6	*Si*
la01	688	698.366 7	12.408 3	4.420 1	0.211 1	*No*
la02	666	686.400 0	17.421 4	4.281 8	0.279 2	*Si*
la03	617	650.200 0	14.164 3	4.378 0	0.279 7	*Si*
la04	613	648.900 0	20.916 3	4.322 7	0.278 9	*Si*
la05	593	593.000 0	0.000 0	4.765 5	NaN	*Si*
la06	926	928.900 0	4.908 2	8.533 2	0.214 0	*No*
la29	1516	1 570.600 0	33.445 1	75.611 9	0.283 2	*Si*
mt06	55	55.100 0	0.395 8	2.999 9	0.119 3	*No*
mt10	1095	1 151.966 7	25.276 4	20.432 3	0.282 8	*Si*
mt20	1328	1 436.300 0	34.282 3	13.329 4	0.271 7	*Si*
orb1	1245	1 300.600 0	33.960 4	20.426 2	0.286 6	*No*
orb2	965	1 022.533 3	29.156 7	20.511 0	0.278 2	*Si*
orb3	1213	1 257.600 0	27.955 4	20.205 6	0.283 3	*Si*
orb4	1105	1 161.766 7	31.560 2	20.545 0	0.280 4	*Si*
orb5	1027	1 096.833 3	35.561 3	20.376 9	0.285 1	*Si*

Table 45: P_C =0.7, $\#Individuos = 100$

3.19 Caso 19:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 421.900 0	26.930 0	20.995 5	0.275 0	Si
abz6	999	1 039.100 0	20.970 4	20.909 5	0.283 4	Si
abz7	910	948.333 3	17.012 4	255.927 1	0.281 6	Si
abz8	927	977.766 7	21.115 1	255.610 9	0.280 1	Si
abz9	945	981.200 0	18.416 3	268.608 1	0.284 2	Si
la01	688	695.633 3	7.622 3	5.368 9	0.215 4	No
la02	664	677.833 3	12.482 2	4.603 3	0.264 4	No
la03	617	649.800 0	13.543 5	4.701 1	0.277 7	Si
la04	618	653.833 3	22.496 0	4.745 8	0.278 8	Si
la05	593	593.000 0	0.000 0	5.227 0	NaN	Si
la06	926	928.466 7	5.713 9	10.247 2	0.167 0	No
la29	1494	1 568.100 0	33.236 9	80.696 1	0.280 3	Si
mt06	55	55.133 3	0.561 7	3.195 0	0.112 7	No
mt10	1102	1 152.033 3	27.658 0	22.776 1	0.279 7	Si
mt20	1366	1 437.200 0	31.534 5	14.481 5	0.279 8	Si
orb1	1240	1 299.766 7	30.320 2	22.058 9	0.285 2	Si
orb2	966	1 015.233 3	28.574 7	22.390 0	0.287 3	No
orb3	1204	1 288.633 3	37.902 1	21.858 9	0.280 7	Si
orb4	1128	1 176.300 0	24.377 8	22.110 3	0.277 4	Si
orb5	1024	1 101.700 0	41.872 1	21.893 6	0.285 7	Si

Table 46: P_C =0.8, $\#Individuos = 100$

3.20 Caso 20:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1357	1 405.300 0	24.257 2	41.136 4	0.286 1	Si
abz6	984	1 020.333 3	16.563 7	40.583 7	0.285 1	Si
abz7	888	930.666 7	17.980 2	523.973 3	0.281 0	Si
abz8	912	947.766 7	19.578 4	538.537 1	0.280 3	Si
abz9	913	949.566 7	17.642 2	498.601 1	0.286 3	Si
la01	688	694.133 3	3.403 3	10.390 3	0.201 1	No
la02	655	673.566 7	12.553 0	9.540 2	0.243 5	No
la03	617	643.100 0	11.866 9	11.011 2	0.266 6	Si
la04	613	637.833 3	17.905 5	9.760 0	0.278 6	Si
la05	593	593.000 0	0.000 0	10.690 6	NaN	Si
la06	926	926.466 7	1.857 1	18.700 5	0.118 5	No
la29	1430	1 515.666 7	37.481 0	157.938 8	0.284 6	Si
mt06	55	55.033 3	0.179 5	6.536 7	0.089 8	No
mt10	1069	1 117.433 3	21.116 6	44.895 5	0.281 8	Si
mt20	1335	1 399.033 3	29.300 2	28.741 0	0.271 9	Si
orb1	1203	1 265.066 7	28.677 4	42.552 6	0.283 0	Si
orb2	947	1 003.200 0	26.010 8	43.313 2	0.282 7	Si
orb3	1165	1 227.833 3	25.543 5	42.521 5	0.266 3	Si
orb4	1097	1 142.666 7	18.192 2	42.833 8	0.277 5	Si
orb5	1030	1 075.533 3	22.454 0	40.051 7	0.279 3	Si

Table 47: P_C =0.7, $\#Individuos = 200$

3.21 Caso 21:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1353	1 412.533 3	23.096 5	43.187 2	0.278 4	*Si*
abz6	965	1 015.266 7	24.679 2	41.688 9	0.277 7	*Si*
abz7	881	925.133 3	15.059 3	522.295 9	0.272 8	*Si*
abz8	915	946.000 0	21.068 1	522.351 3	0.283 2	*Si*
abz9	898	957.466 7	18.707 8	507.136 8	0.271 2	*Si*
la01	688	696.333 3	8.332 0	8.808 3	0.174 2	*No*
la02	657	673.333 3	16.034 0	8.502 8	0.217 2	*No*
la03	630	645.266 7	11.667 4	8.655 7	0.272 8	*Si*
la04	611	636.066 7	17.650 2	8.563 8	0.274 2	*Si*
la05	593	593.000 0	0.000 0	9.549 3	NaN	*Si*
la06	926	926.333 3	1.795 1	17.203 5	0.089 8	*No*
la29	1469	1 521.633 3	31.610 6	148.279 0	0.284 4	*Si*
mt06	55	55.033 3	0.179 5	5.912 0	0.089 8	*No*
mt10	1077	1 116.066 7	21.176 9	40.161 6	0.281 0	*Si*
mt20	1364	1 410.133 3	26.724 2	26.265 1	0.281 6	*Si*
orb1	1189	1 263.000 0	29.607 4	40.591 3	0.278 3	*Si*
orb2	933	993.200 0	25.718 2	40.646 2	0.279 2	*Si*
orb3	1204	1 246.466 7	28.238 0	41.279 8	0.281 6	*Si*
orb4	1100	1 148.166 7	16.484 5	40.194 7	0.275 5	*Si*
orb5	1035	1 077.066 7	26.135 5	40.209 9	0.278 7	*Si*

Table 48: P_C =0.8, $\#Individuos = 200$

3.22 Caso 22:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 404.833 3	27.349 7	40.971 9	0.279 7	*Si*
abz6	976	1 015.866 7	24.902 1	40.646 9	0.280 5	*Si*
abz7	897	929.566 7	16.742 5	510.979 5	0.283 1	*Si*
abz8	908	946.200 0	19.530 1	503.741 5	0.284 1	*Si*
abz9	912	949.566 7	20.571 3	489.697 6	0.286 5	*Si*
la01	688	695.266 7	7.580 4	8.945 2	0.140 9	*No*
la02	664	672.566 7	9.478 7	8.689 2	0.245 6	*No*
la03	635	643.500 0	9.236 7	8.764 6	0.266 6	*Si*
la04	613	641.666 7	17.428 6	8.864 3	0.285 6	*Si*
la05	593	593.000 0	0.000 0	9.632 7	NaN	*Si*
la06	926	926.366 7	1.016 0	17.804 6	0.161 3	*No*
la29	1445	1 508.166 7	35.318 6	148.166 1	0.279 4	*Si*
mt06	55	55.033 3	0.179 5	6.169 1	0.089 8	*No*
mt10	1077	1 121.766 7	27.572 6	42.207 7	0.283 4	*Si*
mt20	1341	1 411.100 0	28.670 9	26.394 8	0.281 5	*Si*
orb1	1183	1 265.766 7	26.318 2	40.512 3	0.270 7	*Si*
orb2	957	1 002.400 0	26.730 3	41.082 2	0.276 5	*Si*
orb3	1173	1 244.500 0	34.390 6	39.885 7	0.284 4	*Si*
orb4	1117	1 150.100 0	19.620 3	41.016 2	0.280 9	*Si*
orb5	1033	1 080.166 7	23.983 4	41.315 2	0.285 5	*Si*

Table 49: P_C =0.6, $\#Individuos = 200$

3.23 Caso 23:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1357	1 405.300 0	24.257 2	41.136 4	0.286 1	*Si*
abz6	984	1 020.333 3	16.563 7	40.583 7	0.285 1	*Si*
abz7	888	930.666 7	17.980 2	523.973 3	0.281 0	*Si*
abz8	912	947.766 7	19.578 4	538.537 1	0.280 3	*Si*
abz9	913	949.566 7	17.642 2	498.601 1	0.286 3	*Si*
la01	688	694.133 3	3.403 3	10.390 3	0.201 1	*No*
la02	655	673.566 7	12.553 0	9.540 2	0.243 5	*No*
la03	617	643.100 0	11.866 9	11.011 2	0.266 6	*Si*
la04	613	637.833 3	17.905 5	9.760 0	0.278 6	*Si*
la05	593	593.000 0	0.000 0	10.690 6	NaN	*Si*
la06	926	926.466 7	1.857 1	18.700 5	0.118 5	*No*
la29	1430	1 515.666 7	37.481 0	157.938 8	0.284 6	*Si*
mt06	55	55.033 3	0.179 5	6.536 7	0.089 8	*No*
mt10	1069	1 117.433 3	21.116 6	44.895 5	0.281 8	*Si*
mt20	1335	1 399.033 3	29.300 2	28.741 0	0.271 9	*Si*
orb1	1203	1 265.066 7	28.677 4	42.552 6	0.283 0	*Si*
orb2	947	1 003.200 0	26.010 8	43.313 2	0.282 7	*Si*
orb3	1165	1 227.833 3	25.543 5	42.521 5	0.266 3	*Si*
orb4	1097	1 142.666 7	18.192 2	42.833 8	0.277 5	*Si*
orb5	1030	1 075.533 3	22.454 0	40.051 7	0.279 3	*Si*

Table 50: P_C =0.7, $\#Individuos = 200$

3.24 Caso 24:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1353	1 412.533 3	23.096 5	43.187 2	0.278 4	*Si*
abz6	965	1 015.266 7	24.679 2	41.688 9	0.277 7	*Si*
abz7	881	925.133 3	15.059 3	522.295 9	0.272 8	*Si*
abz8	915	946.000 0	21.068 1	522.351 3	0.283 2	*Si*
abz9	898	957.466 7	18.707 8	507.136 8	0.271 2	*Si*
la01	688	696.333 3	8.332 0	8.808 3	0.174 2	*No*
la02	657	673.333 3	16.034 0	8.502 8	0.217 2	*No*
la03	630	645.266 7	11.667 4	8.655 7	0.272 8	*Si*
la04	611	636.066 7	17.650 2	8.563 8	0.274 2	*Si*
la05	593	593.000 0	0.000 0	9.549 3	NaN	*Si*
la06	926	926.333 3	1.795 1	17.203 5	0.089 8	*No*
la29	1469	1 521.633 3	31.610 6	148.279 0	0.284 4	*Si*
mt06	55	55.033 3	0.179 5	5.912 0	0.089 8	*No*
mt10	1077	1 116.066 7	21.176 9	40.161 6	0.281 0	*Si*
mt20	1364	1 410.133 3	26.724 2	26.265 1	0.281 6	*Si*
orb1	1189	1 263.000 0	29.607 4	40.591 3	0.278 3	*Si*
orb2	933	993.200 0	25.718 2	40.646 2	0.279 2	*Si*
orb3	1204	1 246.466 7	28.238 0	41.279 8	0.281 6	*Si*
orb4	1100	1 148.166 7	16.484 5	40.194 7	0.275 5	*Si*
orb5	1035	1 077.066 7	26.135 5	40.209 9	0.278 7	*Si*

Table 51: P_C =0.8, $\#Individuos = 200$

3.25 Caso 25:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1348	1 404.833 3	27.349 7	40.971 9	0.279 7	*Si*
abz6	976	1 015.866 7	24.902 1	40.646 9	0.280 5	*Si*
abz7	897	929.566 7	16.742 5	510.979 5	0.283 1	*Si*
abz8	908	946.200 0	19.530 1	503.741 5	0.284 1	*Si*
abz9	912	949.566 7	20.571 3	489.697 6	0.286 5	*Si*
la01	688	695.266 7	7.580 4	8.945 2	0.140 9	*No*
la02	664	672.566 7	9.478 7	8.689 2	0.245 6	*No*
la03	635	643.500 0	9.236 7	8.764 6	0.266 6	*Si*
la04	613	641.666 7	17.428 6	8.864 3	0.285 6	*Si*
la05	593	593.000 0	0.000 0	9.632 7	NaN	*Si*
la06	926	926.366 7	1.016 0	17.804 6	0.161 3	*No*
la29	1445	1 508.166 7	35.318 6	148.166 1	0.279 4	*Si*
mt06	55	55.033 3	0.179 5	6.169 1	0.089 8	*No*
mt10	1077	1 121.766 7	27.572 6	42.207 7	0.283 4	*Si*
mt20	1341	1 411.100 0	28.670 9	26.394 8	0.281 5	*Si*
orb1	1183	1 265.766 7	26.318 2	40.512 3	0.270 7	*Si*
orb2	957	1 002.400 0	26.730 3	41.082 2	0.276 5	*Si*
orb3	1173	1 244.500 0	34.390 6	39.885 7	0.284 4	*Si*
orb4	1117	1 150.100 0	19.620 3	41.016 2	0.280 9	*Si*
orb5	1033	1 080.166 7	23.983 4	41.315 2	0.285 5	*Si*

Table 52: P_C =0.6, $\#Individuos = 200$

3.26 Caso 26:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1357	1 405.300 0	24.257 2	41.136 4	0.286 1	*Si*
abz6	984	1 020.333 3	16.563 7	40.583 7	0.285 1	*Si*
abz7	888	930.666 7	17.980 2	523.973 3	0.281 0	*Si*
abz8	912	947.766 7	19.578 4	538.537 1	0.280 3	*Si*
abz9	913	949.566 7	17.642 2	498.601 1	0.286 3	*Si*
la01	688	694.133 3	3.403 3	10.390 3	0.201 1	*No*
la02	655	673.566 7	12.553 0	9.540 2	0.243 5	*No*
la03	617	643.100 0	11.866 9	11.011 2	0.266 6	*Si*
la04	613	637.833 3	17.905 5	9.760 0	0.278 6	*Si*
la05	593	593.000 0	0.000 0	10.690 6	NaN	*Si*
la06	926	926.466 7	1.857 1	18.700 5	0.118 5	*No*
la29	1430	1 515.666 7	37.481 0	157.938 8	0.284 6	*Si*
mt06	55	55.033 3	0.179 5	6.536 7	0.089 8	*No*
mt10	1069	1 117.433 3	21.116 6	44.895 5	0.281 8	*Si*
mt20	1335	1 399.033 3	29.300 2	28.741 0	0.271 9	*Si*
orb1	1203	1 265.066 7	28.677 4	42.552 6	0.283 0	*Si*
orb2	947	1 003.200 0	26.010 8	43.313 2	0.282 7	*Si*
orb3	1165	1 227.833 3	25.543 5	42.521 5	0.266 3	*Si*
orb4	1097	1 142.666 7	18.192 2	42.833 8	0.277 5	*Si*
orb5	1030	1 075.533 3	22.454 0	40.051 7	0.279 3	*Si*

Table 53: P_C =0.7, $\#Individuos = 200$

3.27 Caso 27:

Instancia	F_{BEST}	F_{AVG}	σ	T_{AVG}	DA	Normal
abz5	1353	1 412.533 3	23.096 5	43.187 2	0.278 4	Si
abz6	965	1 015.266 7	24.679 2	41.688 9	0.277 7	Si
abz7	881	925.133 3	15.059 3	522.295 9	0.272 8	Si
abz8	915	946.000 0	21.068 1	522.351 3	0.283 2	Si
abz9	898	957.466 7	18.707 8	507.136 8	0.271 2	Si
la01	688	696.333 3	8.332 0	8.808 3	0.174 2	No
la02	657	673.333 3	16.034 0	8.502 8	0.217 2	No
la03	630	645.266 7	11.667 4	8.655 7	0.272 8	Si
la04	611	636.066 7	17.650 2	8.563 8	0.274 2	Si
la05	593	593.000 0	0.000 0	9.549 3	NaN	Si
la06	926	926.333 3	1.795 1	17.203 5	0.089 8	No
la29	1469	1 521.633 3	31.610 6	148.279 0	0.284 4	Si
mt06	55	55.033 3	0.179 5	5.912 0	0.089 8	No
mt10	1077	1 116.066 7	21.176 9	40.161 6	0.281 0	Si
mt20	1364	1 410.133 3	26.724 2	26.265 1	0.281 6	Si
orb1	1189	1 263.000 0	29.607 4	40.591 3	0.278 3	Si
orb2	933	993.200 0	25.718 2	40.646 2	0.279 2	Si
orb3	1204	1 246.466 7	28.238 0	41.279 8	0.281 6	Si
orb4	1100	1 148.166 7	16.484 5	40.194 7	0.275 5	Si
orb5	1035	1 077.066 7	26.135 5	40.209 9	0.278 7	Si

Table 54: P_C =0.8, $\#Individuos = 200$

4 GA-CHC

4.1 Caso 1:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1250	1401	1 285.133 3	1 459.800 0	20.001 2	35.051 8	4.693 2	11.064 0	0.279 3	0.283 0	*Si*	*Si*
abz6	943	1019	966.133 3	1 066.900 0	15.059 3	21.606 1	4.821 6	10.787 6	0.279 3	0.281 3	*Si*	*Si*
abz7	726	950	760.066 7	986.066 7	16.459 9	20.013 2	14.739 1	131.034 8	0.282 7	0.281 9	*Si*	*Si*
abz8	750	949	771.333 3	1 006.266 7	15.539 9	21.831 1	14.703 7	129.557 5	0.265 5	0.277 7	*No*	*Si*
abz9	758	961	797.100 0	1 013.766 7	17.539 2	22.309 5	15.162 1	123.642 9	0.278 8	0.259 9	*Si*	*No*
la01	666	688	672.166 7	705.333 3	9.743 7	16.706 0	2.421 4	2.352 0	0.229 2	0.250 9	*No*	*No*
la02	655	666	669.700 0	695.200 0	10.501 3	16.545 7	2.413 5	2.270 1	0.263 0	0.274 3	*No*	*Si*
la03	597	630	617.800 0	661.566 7	13.602 5	15.430 9	2.427 4	2.349 6	0.277 9	0.282 6	*Si*	*Si*
la04	590	613	602.266 7	653.900 0	10.376 0	23.354 3	2.538 1	2.266 4	0.265 2	0.282 4	*No*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.414 7	2.446 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	936.300 0	0.000 0	10.289 6	3.514 3	4.460 9	NaN	0.266 3	*Si*	*Si*
la29	1248	1471	1 309.533 3	1 606.200 0	32.145 2	43.171 3	9.610 9	39.758 9	0.284 9	0.273 1	*Si*	*Si*
mt06	55	55	55.000 0	55.566 7	0.000 0	0.919 5	1.879 8	1.502 1	NaN	0.230 2	*Si*	*No*
mt10	979	1114	1 019.466 7	1 186.633 3	22.740 2	27.183 9	4.701 2	10.541 6	0.285 1	0.275 9	*Si*	*Si*
mt20	1178	1407	1 248.066 7	1 460.200 0	27.234 7	32.086 8	4.795 0	7.035 3	0.269 3	0.271 7	*Si*	*Si*
orb1	1110	1285	1 161.766 7	1 343.300 0	22.115 9	29.196 1	4.976 7	10.703 0	0.284 9	0.283 7	*Si*	*Si*
orb2	909	1015	936.400 0	1 058.766 7	17.543 5	29.216 1	4.893 8	10.799 3	0.269 4	0.275 2	*Si*	*Si*
orb3	1051	1225	1 134.500 0	1 310.600 0	42.246 7	42.320 7	4.832 7	10.499 3	0.276 7	0.283 3	*Si*	*Si*
orb4	1026	1136	1 061.633 3	1 200.400 0	20.779 0	30.465 9	4.940 1	10.661 6	0.283 9	0.283 9	*Si*	*Si*
orb5	913	1075	973.766 7	1 131.933 3	38.542 3	36.697 8	4.711 0	10.460 4	0.276 4	0.286 3	*Si*	*Si*

Table 55: P_C =0.6, P_M =0.01, $\#Individuos = 50$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	$1.436\,0 \cdot 10^{-11}$	u_test
abz9	$1.436\,0 \cdot 10^{-11}$	u_test
la01	$3.517\,0 \cdot 10^{-11}$	u_test
la02	$3.799\,6 \cdot 10^{-07}$	u_test
la03	1.000 0	t_test
la04	$5.207\,8 \cdot 10^{-11}$	u_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	1.000 0	t_test
mt06	0.013 3	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 56: P_C =0.6, P_M =0.01, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.2 Caso 2:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1250	1366	1 294.666 7	1 429.233 3	23.218 3	29.108 6	4.772 3	20.907 9	0.273 9	0.280 6	*Si*	*Si*
abz6	947	991	972.433 3	1 047.633 3	15.224 3	25.453 9	4.871 1	20.445 0	0.262 0	0.280 6	*No*	*Si*
abz7	720	912	764.533 3	955.400 0	16.918 9	19.853 8	14.678 1	258.749 2	0.277 8	0.282 6	*Si*	*Si*
abz8	746	935	775.966 7	974.633 3	17.827 8	17.211 4	14.940 3	251.367 5	0.265 5	0.280 1	*No*	*Si*
abz9	777	931	807.300 0	986.333 3	18.213 8	23.850 0	14.894 3	247.559 5	0.267 3	0.281 9	*Si*	*Si*
la01	666	688	670.233 3	698.766 7	8.228 7	10.852 6	2.566 9	4.405 3	0.205 4	0.192 5	*No*	*No*
la02	655	664	670.000 0	682.533 3	13.672 4	17.348 8	2.569 6	4.294 2	0.265 1	0.272 3	*No*	*Si*
la03	597	617	617.200 0	648.300 0	9.662 3	14.633 6	2.579 7	4.375 0	0.280 7	0.281 4	*Si*	*Si*
la04	590	613	601.000 0	650.733 3	7.492 2	20.972 9	2.572 6	4.306 1	0.274 1	0.281 5	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.579 0	4.711 8	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	927.166 7	0.000 0	1.881 2	3.742 5	8.495 7	NaN	0.227 7	*Si*	*No*
la29	1256	1501	1 315.833 3	1 568.466 7	26.269 2	37.871 5	9.639 9	75.585 5	0.283 9	0.287 5	*Si*	*No*
mt06	55	55	55.200 0	55.133 3	0.600 0	0.426 9	1.946 9	3.067 4	0.150 0	0.143 2	*No*	*No*
mt10	968	1076	1 016.300 0	1 140.333 3	26.302 3	25.530 8	4.978 3	20.969 4	0.284 5	0.281 4	*Si*	*Si*
mt20	1193	1383	1 257.366 7	1 425.900 0	35.681 4	25.575 2	4.901 9	13.562 6	0.279 4	0.278 6	*Si*	*Si*
orb1	1104	1239	1 157.200 0	1 305.500 0	31.205 1	39.689 4	4.982 3	20.937 8	0.278 7	0.278 6	*Si*	*Si*
orb2	915	950	942.433 3	1 024.600 0	15.074 7	34.891 8	5.034 3	20.708 4	0.277 1	0.274 6	*Si*	*Si*
orb3	1074	1225	1 139.633 3	1 280.200 0	34.937 5	35.853 8	5.229 1	20.710 7	0.283 6	0.284 7	*Si*	*Si*
orb4	1027	1120	1 061.566 7	1 180.766 7	21.472 0	29.903 9	5.023 9	20.995 5	0.276 3	0.285 6	*Si*	*Si*
orb5	904	1040	974.566 7	1 107.500 0	38.151 2	35.008 3	4.991 6	21.352 2	0.281 5	0.273 7	*Si*	*Si*

Table 57: P_C =0.6, P_M =0.01, $\#Individuos = 100$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	$2.886\,5 \cdot 10^{-11}$	u_test
abz7	1.000 0	t_test
abz8	$1.436\,0 \cdot 10^{-11}$	u_test
abz9	1.000 0	t_test
la01	$2.367\,0 \cdot 10^{-11}$	u_test
la02	0.006 9	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.007 4	u_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	0.517 7	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 58: P_C =0.6, P_M =0.01, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.3 Caso 3:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1250	1348	1 292.300 0	1 404.833 3	24.851 8	27.349 7	5.055 8	40.971 9	0.283 8	0.279 7	*Si*	*Si*
abz6	945	976	971.833 3	1 015.866 7	17.156 3	24.902 1	5.051 5	40.646 9	0.284 8	0.280 5	*Si*	*Si*
abz7	739	897	767.800 0	929.566 7	14.150 1	16.742 5	15.001 2	510.979 5	0.282 1	0.283 1	*Si*	*Si*
abz8	757	908	779.066 7	946.200 0	16.635 2	19.530 1	14.978 2	503.741 5	0.273 2	0.284 1	*Si*	*Si*
abz9	771	912	806.600 0	949.566 7	18.573 5	20.571 3	14.969 8	489.697 6	0.273 6	0.286 5	*Si*	*Si*
la01	666	688	668.333 3	695.266 7	5.787 0	7.580 4	2.718 3	8.945 2	0.172 6	0.140 9	*No*	*No*
la02	655	664	668.700 0	672.566 7	7.160 8	9.478 7	2.674 4	8.689 2	0.275 7	0.245 6	*Si*	*No*
la03	603	635	618.466 7	643.500 0	12.249 4	9.236 7	2.718 8	8.764 6	0.282 3	0.266 6	*Si*	*Si*
la04	590	613	599.733 3	641.666 7	7.178 4	17.428 6	2.675 7	8.864 3	0.279 9	0.285 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.671 4	9.632 7	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.366 7	0.000 0	1.016 0	3.861 6	17.804 6	NaN	0.161 3	*Si*	*No*
la29	1257	1445	1 319.033 3	1 508.166 7	37.931 9	35.318 6	9.797 7	148.166 1	0.284 6	0.279 4	*Si*	*Si*
mt06	55	55	55.066 7	55.033 3	0.359 0	0.179 5	1.939 2	6.169 1	0.089 8	0.089 8	*No*	*No*
mt10	993	1077	1 033.800 0	1 121.766 7	32.639 9	27.572 6	5.055 9	42.207 7	0.279 4	0.283 4	*Si*	*Si*
mt20	1198	1341	1 244.866 7	1 411.100 0	27.513 3	28.670 9	4.968 0	26.394 8	0.283 5	0.281 5	*Si*	*Si*
orb1	1106	1183	1 163.400 0	1 265.766 7	31.575 9	26.318 2	5.041 0	40.512 3	0.275 1	0.270 7	*Si*	*Si*
orb2	901	957	937.900 0	1 002.400 0	20.381 9	26.730 3	5.062 8	41.082 2	0.280 5	0.276 5	*Si*	*Si*
orb3	1050	1173	1 126.466 7	1 244.500 0	38.222 8	34.390 6	5.048 3	39.885 7	0.284 5	0.284 4	*Si*	*Si*
orb4	1031	1117	1 066.100 0	1 150.100 0	21.698 5	19.620 3	5.062 0	41.016 2	0.273 6	0.280 9	*Si*	*Si*
orb5	890	1033	974.800 0	1 080.166 7	32.431 9	23.983 4	5.077 5	41.315 2	0.275 7	0.285 5	*Si*	*Si*

Table 59: P_C =0.6, P_M =0.01, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.142\,8 \cdot 10^{-11}$	u_test
la02	0.137 0	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.187 5	u_test
la29	1.000 0	t_test
mt06	0.502 9	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 60: P_C =0.6, P_M =0.01, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.4 Caso 4:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1251	1375	1 283.166 7	1 445.933 3	18.815 0	33.415 5	5.262 1	11.280 3	0.286 3	0.282 0	*Si*	*Si*
abz6	958	990	979.433 3	1 063.900 0	15.491 3	31.593 6	5.143 9	10.856 4	0.278 3	0.277 4	*Si*	*Si*
abz7	723	934	757.900 0	976.933 3	16.988 9	18.262 8	16.053 3	130.759 6	0.283 2	0.268 4	*Si*	*Si*
abz8	731	958	772.400 0	1 003.133 3	15.085 5	18.638 2	15.991 5	133.024 1	0.276 1	0.283 9	*Si*	*Si*
abz9	774	960	799.300 0	1 018.733 3	16.383 2	28.383 0	16.057 3	129.749 9	0.278 9	0.281 3	*Si*	*Si*
la01	666	688	670.600 0	698.800 0	8.708 6	10.821 0	2.700 8	2.298 9	0.206 7	0.229 2	*No*	*No*
la02	655	666	666.800 0	699.733 3	9.392 9	15.292 6	2.703 9	2.315 0	0.258 1	0.280 7	*No*	*Si*
la03	597	635	617.833 3	655.266 7	12.543 5	13.913 9	2.717 4	2.338 9	0.283 3	0.280 1	*Si*	*Si*
la04	590	622	600.866 7	657.400 0	7.906 7	21.523 0	2.726 7	2.346 4	0.281 6	0.286 9	*Si*	*No*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.662 6	2.490 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.033 3	0.000 0	11.951 2	3.973 2	4.748 4	NaN	0.267 1	*Si*	*Si*
la29	1264	1520	1 308.900 0	1 620.000 0	28.508 9	38.523 6	10.534 5	40.363 8	0.273 0	0.279 9	*Si*	*Si*
mt06	55	55	55.000 0	55.633 3	0.000 0	0.982 6	1.985 9	1.537 9	NaN	0.234 6	*Si*	*No*
mt10	971	1123	1 023.533 3	1 186.666 7	27.189 1	32.953 8	5.105 5	10.701 9	0.276 5	0.282 3	*Si*	*Si*
mt20	1199	1416	1 248.233 3	1 468.433 3	31.231 1	28.867 1	5.121 0	6.986 2	0.283 3	0.286 7	*Si*	*No*
orb1	1123	1252	1 158.200 0	1 330.666 7	20.039 0	36.213 6	5.108 8	10.698 2	0.265 8	0.281 5	*No*	*Si*
orb2	900	988	939.733 3	1 064.600 0	17.324 2	38.086 4	5.120 8	11.071 5	0.277 8	0.284 8	*Si*	*Si*
orb3	1047	1224	1 147.700 0	1 309.200 0	43.316 8	38.485 8	5.109 3	10.877 0	0.282 8	0.282 2	*Si*	*Si*
orb4	1012	1139	1 058.033 3	1 211.366 7	25.719 6	37.220 5	5.288 8	10.788 1	0.283 1	0.284 5	*Si*	*Si*
orb5	896	1049	976.500 0	1 127.633 3	34.188 4	41.789 5	5.330 7	10.549 5	0.275 6	0.277 4	*Si*	*Si*

Table 61: P_C =0.7, P_M =0.01, $\#Individuos = 50$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$4.722\,5 \cdot 10^{-11}$	u_test
la02	$4.656\,7 \cdot 10^{-10}$	u_test
la03	1.000 0	t_test
la04	$1.436\,0 \cdot 10^{-11}$	u_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	1.000 0	t_test
mt06	0.007 4	u_test
mt10	1.000 0	t_test
mt20	$1.436\,0 \cdot 10^{-11}$	u_test
orb1	$1.436\,0 \cdot 10^{-11}$	u_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 62: P_C =0.7, P_M =0.01, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.5 Caso 5:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1242	1393	1 284.433 3	1 463.300 0	25.283 3	24.847 7	5.590 6	11.198 7	0.261 7	0.258 1	*No*	*No*
abz6	947	983	970.900 0	1 063.766 7	16.365 3	30.599 2	5.275 0	10.663 5	0.282 0	0.276 7	*Si*	*Si*
abz7	732	939	759.533 3	983.200 0	16.928 7	23.165 2	16.648 5	132.675 4	0.271 9	0.284 7	*Si*	*Si*
abz8	746	956	772.666 7	1 010.300 0	15.397 7	24.529 1	16.603 3	130.708 1	0.279 7	0.280 1	*Si*	*Si*
abz9	762	971	798.400 0	1 007.466 7	17.073 6	21.769 6	16.875 2	124.835 0	0.284 0	0.277 1	*Si*	*Si*
la01	666	688	671.000 0	707.800 0	8.767 4	18.351 0	2.752 9	2.253 7	0.218 1	0.257 1	*No*	*No*
la02	655	666	666.833 3	696.866 7	11.384 4	24.806 9	2.779 1	2.246 3	0.270 3	0.277 3	*Si*	*Si*
la03	597	635	614.600 0	658.166 7	9.311 6	11.980 8	2.719 7	2.243 6	0.268 4	0.281 6	*Si*	*Si*
la04	590	613	602.700 0	648.933 3	8.323 3	23.236 4	2.744 2	2.224 4	0.282 3	0.284 2	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.718 4	2.413 4	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.366 7	0.000 0	12.413 7	4.041 7	4.538 7	NaN	0.268 7	*Si*	*Si*
la29	1247	1535	1 311.300 0	1 616.466 7	25.880 7	33.934 0	10.963 3	38.515 3	0.273 6	0.281 6	*Si*	*Si*
mt06	55	55	55.166 7	55.433 3	0.636 8	0.955 1	2.109 8	1.561 5	0.123 0	0.191 4	*No*	*No*
mt10	951	1106	1 021.166 7	1 169.166 7	30.459 9	27.794 6	5.344 3	10.754 2	0.275 2	0.283 0	*Si*	*Si*
mt20	1181	1400	1 253.933 3	1 472.233 3	39.196 0	45.214 1	5.222 0	6.809 4	0.282 9	0.283 8	*Si*	*Si*
orb1	1103	1206	1 156.666 7	1 321.633 3	26.093 8	47.574 1	5.497 0	10.449 9	0.276 7	0.279 1	*Si*	*Si*
orb2	894	972	926.300 0	1 050.633 3	14.679 1	43.152 0	5.473 8	10.697 5	0.262 2	0.277 7	*No*	*Si*
orb3	1077	1242	1 128.666 7	1 310.266 7	33.679 2	43.714 9	5.624 3	10.336 7	0.286 8	0.286 4	*No*	*Si*
orb4	1012	1147	1 055.466 7	1 209.200 0	18.289 8	34.301 0	5.739 0	10.529 0	0.278 2	0.284 5	*Si*	*Si*
orb5	925	1067	973.833 3	1 118.266 7	30.623 6	33.602 5	5.528 1	10.476 9	0.284 6	0.280 5	*Si*	*Si*

Table 63: P_C =0.8, P_M =0.01, $\#Individuos = 50$

Instancia	$p - value$	Test
abz5	$1.436\,0 \cdot 10^{-11}$	u_test
abz6	$1.000\,0$	t_test
abz7	$1.000\,0$	t_test
abz8	$1.000\,0$	t_test
abz9	$1.000\,0$	t_test
la01	$1.939\,4 \cdot 10^{-11}$	u_test
la02	$1.000\,0$	t_test
la03	$1.000\,0$	t_test
la04	$1.000\,0$	t_test
la05	NaN	$t\_test(*)$
la06	$1.000\,0$	t_test
la29	$1.000\,0$	t_test
mt06	$0.191\,5$	u_test
mt10	$1.000\,0$	t_test
mt20	$1.000\,0$	t_test
orb1	$1.000\,0$	t_test
orb2	$1.587\,6 \cdot 10^{-11}$	u_test
orb3	$1.436\,0 \cdot 10^{-11}$	u_test
orb4	$1.000\,0$	t_test
orb5	$1.000\,0$	t_test

Table 64: P_C =0.8, P_M =0.01, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.6 Caso 6:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1242	1401	1 281.066 7	1 459.800 0	21.304 0	35.051 8	5.002 1	11.064 0	0.275 2	0.283 0	*Si*	*Si*
abz6	945	1019	969.500 0	1 066.900 0	17.366 2	21.606 1	4.915 6	10.787 6	0.275 7	0.281 3	*Si*	*Si*
abz7	731	950	761.133 3	986.066 7	16.999 5	20.013 2	15.186 7	131.034 8	0.283 8	0.281 9	*Si*	*Si*
abz8	754	949	771.400 0	1 006.266 7	12.901 2	21.831 1	15.049 6	129.557 5	0.280 3	0.277 7	*Si*	*Si*
abz9	752	961	796.400 0	1 013.766 7	17.571 9	22.309 5	15.091 6	123.642 9	0.279 4	0.259 9	*Si*	*No*
la01	666	688	670.666 7	705.333 3	8.291 9	16.706 0	2.565 2	2.352 0	0.217 9	0.250 9	*No*	*No*
la02	655	666	666.000 0	695.200 0	9.818 4	16.545 7	2.577 5	2.270 1	0.271 6	0.274 3	*Si*	*Si*
la03	603	630	616.533 3	661.566 7	9.440 1	15.430 9	2.618 2	2.349 6	0.279 8	0.282 6	*Si*	*Si*
la04	590	613	602.433 3	653.900 0	7.423 8	23.354 3	2.576 5	2.266 4	0.283 4	0.282 4	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.537 2	2.446 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	936.300 0	0.000 0	10.289 6	3.759 0	4.460 9	NaN	0.266 3	*Si*	*Si*
la29	1262	1471	1 307.666 7	1 606.200 0	29.886 8	43.171 3	9.898 4	39.758 9	0.280 5	0.273 1	*Si*	*Si*
mt06	55	55	55.133 3	55.566 7	0.498 9	0.919 5	1.888 4	1.502 1	0.124 7	0.230 2	*No*	*No*
mt10	978	1114	1 027.500 0	1 186.633 3	22.405 0	27.183 9	4.930 2	10.541 6	0.271 6	0.275 9	*Si*	*Si*
mt20	1202	1407	1 259.066 7	1 460.200 0	27.929 6	32.086 8	4.921 4	7.035 3	0.282 9	0.271 7	*Si*	*Si*
orb1	1111	1285	1 162.333 3	1 343.300 0	28.113 3	29.196 1	4.972 3	10.703 0	0.286 4	0.283 7	*Si*	*Si*
orb2	893	1015	932.366 7	1 058.766 7	20.257 5	29.216 1	4.959 6	10.799 3	0.284 8	0.275 2	*Si*	*Si*
orb3	1069	1225	1 126.900 0	1 310.600 0	31.891 8	42.320 7	4.951 6	10.499 3	0.282 3	0.283 3	*Si*	*Si*
orb4	1011	1136	1 057.000 0	1 200.400 0	24.804 6	30.465 9	5.021 1	10.661 6	0.276 6	0.283 9	*Si*	*Si*
orb5	912	1075	974.733 3	1 131.933 3	32.556 5	36.697 8	5.008 6	10.460 4	0.277 4	0.286 3	*Si*	*Si*

Table 65: P_C =0.6, P_M =0.05, $\#Individuos = 50$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	$1.436\,0 \cdot 10^{-11}$	u_test
la01	$2.367\,0 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	1.000 0	t_test
mt06	0.041 8	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 66: P_C =0.6, P_M =0.05, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.7 Caso 7:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1249	1375	1 280.100 0	1 445.933 3	17.125 7	33.415 5	5.037 1	11.280 3	0.272 2	0.282 0	*Si*	*Si*
abz6	945	990	969.466 7	1 063.900 0	14.389 2	31.593 6	5.031 2	10.856 4	0.265 2	0.277 4	*No*	*Si*
abz7	732	934	759.400 0	976.933 3	14.302 9	18.262 8	15.963 3	130.759 6	0.284 4	0.268 4	*Si*	*Si*
abz8	746	958	774.433 3	1 003.133 3	18.911 5	18.638 2	15.785 6	133.024 1	0.279 6	0.283 9	*Si*	*Si*
abz9	775	960	798.933 3	1 018.733 3	16.403 1	28.383 0	15.690 6	129.749 9	0.281 9	0.281 3	*Si*	*Si*
la01	666	688	668.266 7	698.800 0	6.582 5	10.821 0	2.579 8	2.298 9	0.154 1	0.229 2	*No*	*No*
la02	655	666	669.000 0	699.733 3	10.767 2	15.292 6	2.595 8	2.315 0	0.259 3	0.280 7	*No*	*Si*
la03	597	635	612.033 3	655.266 7	10.176 7	13.913 9	2.692 1	2.338 9	0.273 1	0.280 1	*Si*	*Si*
la04	590	622	604.166 7	657.400 0	7.439 0	21.523 0	2.620 1	2.346 4	0.272 8	0.286 9	*Si*	*No*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.577 3	2.490 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.033 3	0.000 0	11.951 2	3.913 5	4.748 4	NaN	0.267 1	*Si*	*Si*
la29	1264	1520	1 310.400 0	1 620.000 0	25.890 3	38.523 6	10.077 8	40.363 8	0.285 7	0.279 9	*Si*	*Si*
mt06	55	55	55.200 0	55.633 3	0.600 0	0.982 6	1.992 6	1.537 9	0.150 0	0.234 6	*No*	*No*
mt10	958	1123	1 033.233 3	1 186.666 7	28.893 7	32.953 8	5.099 1	10.701 9	0.278 2	0.282 3	*Si*	*Si*
mt20	1203	1416	1 259.400 0	1 468.433 3	35.999 6	28.867 1	5.009 2	6.986 2	0.282 7	0.286 7	*Si*	*No*
orb1	1122	1252	1 166.133 3	1 330.666 7	24.405 9	36.213 6	5.163 3	10.698 2	0.280 4	0.281 5	*Si*	*Si*
orb2	894	988	938.100 0	1 064.600 0	20.965 6	38.086 4	5.033 5	11.071 5	0.266 8	0.284 8	*Si*	*Si*
orb3	1074	1224	1 134.500 0	1 309.200 0	31.562 4	38.485 8	5.015 2	10.877 0	0.284 4	0.282 2	*Si*	*Si*
orb4	1031	1139	1 062.533 3	1 211.366 7	28.221 4	37.220 5	5.170 9	10.788 1	0.249 7	0.284 5	*No*	*Si*
orb5	914	1049	970.566 7	1 127.633 3	26.750 3	41.789 5	5.170 4	10.549 5	0.278 2	0.277 4	*Si*	*Si*

Table 67: P_C =0.7, P_M =0.05, $\#Individuos = 50$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	$1.939\,4 \cdot 10^{-11}$	u_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.614\,2 \cdot 10^{-11}$	u_test
la02	$1.598\,4 \cdot 10^{-09}$	u_test
la03	1.000 0	t_test
la04	$1.509\,9 \cdot 10^{-11}$	u_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	1.000 0	t_test
mt06	0.043 9	u_test
mt10	1.000 0	t_test
mt20	$1.436\,0 \cdot 10^{-11}$	u_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	$2.252\,2 \cdot 10^{-11}$	u_test
orb5	1.000 0	t_test

Table 68: P_C =0.7, P_M =0.05, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.8 Caso 8:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1249	1393	1 284.100 0	1 463.300 0	24.114 1	24.847 7	5.930 7	11.198 7	0.278 4	0.258 1	*Si*	*No*
abz6	945	983	968.033 3	1 063.766 7	16.416 4	30.599 2	5.372 2	10.663 5	0.279 3	0.276 7	*Si*	*Si*
abz7	727	939	759.000 0	983.200 0	15.722 6	23.165 2	16.875 2	132.675 4	0.282 0	0.284 7	*Si*	*Si*
abz8	735	956	771.266 7	1 010.300 0	19.641 7	24.529 1	17.224 9	130.708 1	0.281 1	0.280 1	*Si*	*Si*
abz9	765	971	800.333 3	1 007.466 7	13.491 6	21.769 6	17.024 3	124.835 0	0.278 5	0.277 1	*Si*	*Si*
la01	666	688	669.900 0	707.800 0	8.109 0	18.351 0	2.946 5	2.253 7	0.195 5	0.257 1	*No*	*No*
la02	655	666	670.800 0	696.866 7	9.934 5	24.806 9	3.140 7	2.246 3	0.253 4	0.277 3	*No*	*Si*
la03	597	635	612.966 7	658.166 7	10.725 3	11.980 8	2.859 7	2.243 6	0.280 8	0.281 6	*Si*	*Si*
la04	590	613	601.466 7	648.933 3	7.851 7	23.236 4	2.802 1	2.224 4	0.274 0	0.284 2	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.838 4	2.413 4	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.366 7	0.000 0	12.413 7	4.076 0	4.538 7	NaN	0.268 7	*Si*	*Si*
la29	1265	1535	1 317.033 3	1 616.466 7	29.835 6	33.934 0	11.065 2	38.515 3	0.287 3	0.281 6	*No*	*Si*
mt06	55	55	55.300 0	55.433 3	0.781 0	0.955 1	2.135 4	1.561 5	0.168 6	0.191 4	*No*	*No*
mt10	964	1106	1 031.366 7	1 169.166 7	31.128 2	27.794 6	5.636 6	10.754 2	0.276 3	0.283 0	*Si*	*Si*
mt20	1201	1400	1 247.633 3	1 472.233 3	25.964 7	45.214 1	5.390 4	6.809 4	0.276 0	0.283 8	*Si*	*Si*
orb1	1119	1206	1 164.566 7	1 321.633 3	26.044 4	47.574 1	5.624 1	10.449 9	0.287 2	0.279 1	*No*	*Si*
orb2	907	972	934.033 3	1 050.633 3	18.872 3	43.152 0	5.554 1	10.697 5	0.277 6	0.277 7	*Si*	*Si*
orb3	1089	1242	1 151.566 7	1 310.266 7	41.478 3	43.714 9	5.702 3	10.336 7	0.282 8	0.286 4	*Si*	*Si*
orb4	1012	1147	1 056.633 3	1 209.200 0	22.178 8	34.301 0	5.728 5	10.529 0	0.284 5	0.284 5	*Si*	*Si*
orb5	909	1067	969.133 3	1 118.266 7	32.589 1	33.602 5	5.817 4	10.476 9	0.284 5	0.280 5	*Si*	*Si*

Table 69: P_C =0.8, P_M =0.05, $\#Individuos = 50$

Instancia	$p - value$	Test
abz5	$1.436\,0 \cdot 10^{-11}$	u_test
abz6	$1.000\,0$	t_test
abz7	$1.000\,0$	t_test
abz8	$1.000\,0$	t_test
abz9	$1.000\,0$	t_test
la01	$1.844\,9 \cdot 10^{-11}$	u_test
la02	$6.912\,5 \cdot 10^{-06}$	u_test
la03	$1.000\,0$	t_test
la04	$1.000\,0$	t_test
la05	NaN	$t\_test(*)$
la06	$1.000\,0$	t_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	$0.328\,7$	u_test
mt10	$1.000\,0$	t_test
mt20	$1.000\,0$	t_test
orb1	$1.587\,6 \cdot 10^{-11}$	u_test
orb2	$1.000\,0$	t_test
orb3	$1.000\,0$	t_test
orb4	$1.000\,0$	t_test
orb5	$1.000\,0$	t_test

Table 70: P_C =0.8, P_M =0.05, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.9 Caso 9:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1250	1401	1 287.066 7	1 459.800 0	21.189 5	35.051 8	4.946 6	11.064 0	0.275 5	0.283 0	*Si*	*Si*
abz6	947	1019	974.166 7	1 066.900 0	17.731 5	21.606 1	4.965 1	10.787 6	0.282 0	0.281 3	*Si*	*Si*
abz7	725	950	759.466 7	986.066 7	16.728 7	20.013 2	15.209 0	131.034 8	0.268 1	0.281 9	*Si*	*Si*
abz8	738	949	770.133 3	1 006.266 7	14.155 6	21.831 1	15.170 3	129.557 5	0.274 8	0.277 7	*Si*	*Si*
abz9	775	961	807.466 7	1 013.766 7	18.501 8	22.309 5	15.050 0	123.642 9	0.282 5	0.259 9	*Si*	*No*
la01	666	688	671.333 3	705.333 3	8.836 8	16.706 0	2.518 6	2.352 0	0.225 8	0.250 9	*No*	*No*
la02	655	666	669.400 0	695.200 0	9.218 1	16.545 7	2.535 8	2.270 1	0.271 1	0.274 3	*Si*	*Si*
la03	603	630	616.800 0	661.566 7	11.740 0	15.430 9	2.521 1	2.349 6	0.278 6	0.282 6	*Si*	*Si*
la04	590	613	605.300 0	653.900 0	14.888 8	23.354 3	2.462 4	2.266 4	0.249 2	0.282 4	*No*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.556 2	2.446 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	936.300 0	0.000 0	10.289 6	3.768 7	4.460 9	NaN	0.266 3	*Si*	*Si*
la29	1266	1471	1 308.300 0	1 606.200 0	34.238 5	43.171 3	9.937 3	39.758 9	0.279 4	0.273 1	*Si*	*Si*
mt06	55	55	55.133 3	55.566 7	0.498 9	0.919 5	1.837 7	1.502 1	0.124 7	0.230 2	*No*	*No*
mt10	951	1114	1 027.366 7	1 186.633 3	27.430 5	27.183 9	5.033 5	10.541 6	0.273 2	0.275 9	*Si*	*Si*
mt20	1193	1407	1 242.500 0	1 460.200 0	24.620 8	32.086 8	4.891 2	7.035 3	0.283 9	0.271 7	*Si*	*Si*
orb1	1123	1285	1 160.866 7	1 343.300 0	21.623 6	29.196 1	4.902 1	10.703 0	0.279 2	0.283 7	*Si*	*Si*
orb2	897	1015	941.100 0	1 058.766 7	22.196 6	29.216 1	4.936 1	10.799 3	0.259 9	0.275 2	*No*	*Si*
orb3	1073	1225	1 130.733 3	1 310.600 0	33.733 2	42.320 7	4.864 8	10.499 3	0.278 2	0.283 3	*Si*	*Si*
orb4	1026	1136	1 058.666 7	1 200.400 0	19.418 8	30.465 9	4.957 3	10.661 6	0.279 4	0.283 9	*Si*	*Si*
orb5	895	1075	975.200 0	1 131.933 3	35.084 1	36.697 8	4.932 3	10.460 4	0.275 0	0.286 3	*Si*	*Si*

Table 71: P_C =0.6, P_M =0.1, $\#Individuos = 50$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	$1.436\,0 \cdot 10^{-11}$	u_test
la01	$2.614\,2 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	1.000 0	t_test
la04	$3.361\,0 \cdot 10^{-10}$	u_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	1.000 0	t_test
mt06	0.041 8	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	$1.587\,6 \cdot 10^{-11}$	u_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 72: P_C =0.6, P_M =0.1, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.10 Caso 10:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1259	1375	1 284.866 7	1 445.933 3	16.372 2	33.415 5	5.139 7	11.280 3	0.279 3	0.282 0	*Si*	*Si*
abz6	947	990	972.633 3	1 063.900 0	16.326 8	31.593 6	5.156 2	10.856 4	0.273 1	0.277 4	*Si*	*Si*
abz7	728	934	758.966 7	976.933 3	13.617 4	18.262 8	15.914 1	130.759 6	0.280 9	0.268 4	*Si*	*Si*
abz8	754	958	772.966 7	1 003.133 3	14.288 7	18.638 2	16.095 9	133.024 1	0.274 5	0.283 9	*Si*	*Si*
abz9	769	960	800.900 0	1 018.733 3	18.170 2	28.383 0	16.632 7	129.749 9	0.286 5	0.281 3	*Si*	*Si*
la01	666	688	670.200 0	698.800 0	8.243 8	10.821 0	2.707 4	2.298 9	0.204 5	0.229 2	*No*	*No*
la02	655	666	667.466 7	699.733 3	7.575 1	15.292 6	2.710 8	2.315 0	0.281 9	0.280 7	*Si*	*Si*
la03	597	635	620.200 0	655.266 7	12.141 9	13.913 9	2.663 8	2.338 9	0.264 9	0.280 1	*No*	*Si*
la04	593	622	601.400 0	657.400 0	7.427 9	21.523 0	2.616 5	2.346 4	0.262 1	0.286 9	*No*	*No*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.695 5	2.490 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.033 3	0.000 0	11.951 2	4.087 4	4.748 4	NaN	0.267 1	*Si*	*Si*
la29	1262	1520	1 309.700 0	1 620.000 0	24.855 8	38.523 6	10.357 0	40.363 8	0.257 5	0.279 9	*No*	*Si*
mt06	55	55	55.233 3	55.633 3	0.715 7	0.982 6	1.962 9	1.537 9	0.148 3	0.234 6	*No*	*No*
mt10	964	1123	1 023.966 7	1 186.666 7	27.029 0	32.953 8	5.203 4	10.701 9	0.283 5	0.282 3	*Si*	*Si*
mt20	1204	1416	1 245.233 3	1 468.433 3	23.819 7	28.867 1	5.203 8	6.986 2	0.284 7	0.286 7	*Si*	*No*
orb1	1091	1252	1 153.666 7	1 330.666 7	30.325 3	36.213 6	5.236 2	10.698 2	0.278 2	0.281 5	*Si*	*Si*
orb2	911	988	938.766 7	1 064.600 0	17.736 4	38.086 4	5.232 5	11.071 5	0.286 0	0.284 8	*Si*	*Si*
orb3	1061	1224	1 134.766 7	1 309.200 0	37.553 2	38.485 8	5.123 0	10.877 0	0.285 2	0.282 2	*Si*	*Si*
orb4	1022	1139	1 054.633 3	1 211.366 7	17.573 6	37.220 5	5.240 5	10.788 1	0.283 2	0.284 5	*Si*	*Si*
orb5	910	1049	972.933 3	1 127.633 3	36.109 0	41.789 5	5.222 9	10.549 5	0.284 0	0.277 4	*Si*	*Si*

Table 73: P_C =0.7, P_M =0.1, $\#Individuos = 50$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$3.880\,9 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	$1.368\,8 \cdot 10^{-10}$	u_test
la04	$1.436\,0 \cdot 10^{-11}$	u_test
la05	NaN	$t\_test(*)$
la06	1.000 0	t_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	0.047 4	u_test
mt10	1.000 0	t_test
mt20	$1.436\,0 \cdot 10^{-11}$	u_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 74: P_C =0.7, P_M =0.1, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.11 Caso 11:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1239	1393	1 285.166 7	1 463.300 0	24.184 1	24.847 7	5.354 0	11.198 7	0.285 1	0.258 1	*Si*	*No*
abz6	947	983	974.400 0	1 063.766 7	17.346 7	30.599 2	5.533 6	10.663 5	0.267 6	0.276 7	*Si*	*Si*
abz7	724	939	762.966 7	983.200 0	17.694 6	23.165 2	16.946 8	132.675 4	0.280 4	0.284 7	*Si*	*Si*
abz8	734	956	770.266 7	1 010.300 0	19.590 7	24.529 1	16.802 1	130.708 1	0.280 5	0.280 1	*Si*	*Si*
abz9	763	971	798.666 7	1 007.466 7	17.812 6	21.769 6	17.140 9	124.835 0	0.278 1	0.277 1	*Si*	*Si*
la01	666	688	668.700 0	707.800 0	6.283 0	18.351 0	2.790 8	2.253 7	0.184 5	0.257 1	*No*	*No*
la02	655	666	667.500 0	696.866 7	10.068 9	24.806 9	2.888 0	2.246 3	0.269 2	0.277 3	*Si*	*Si*
la03	597	635	615.900 0	658.166 7	12.133 6	11.980 8	2.861 0	2.243 6	0.276 5	0.281 6	*Si*	*Si*
la04	590	613	601.133 3	648.933 3	7.288 0	23.236 4	2.849 5	2.224 4	0.275 9	0.284 2	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.894 3	2.413 4	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	937.366 7	0.000 0	12.413 7	4.191 0	4.538 7	NaN	0.268 7	*Si*	*Si*
la29	1260	1535	1 298.633 3	1 616.466 7	32.012 0	33.934 0	11.259 6	38.515 3	0.271 1	0.281 6	*Si*	*Si*
mt06	55	55	55.200 0	55.433 3	0.600 0	0.955 1	2.111 3	1.561 5	0.150 0	0.191 4	*No*	*No*
mt10	969	1106	1 027.833 3	1 169.166 7	29.481 2	27.794 6	5.551 9	10.754 2	0.283 4	0.283 0	*Si*	*Si*
mt20	1194	1400	1 247.466 7	1 472.233 3	34.715 7	45.214 1	5.470 1	6.809 4	0.276 3	0.283 8	*Si*	*Si*
orb1	1106	1206	1 169.966 7	1 321.633 3	31.583 2	47.574 1	5.575 4	10.449 9	0.273 7	0.279 1	*Si*	*Si*
orb2	914	972	936.166 7	1 050.633 3	15.782 0	43.152 0	5.521 1	10.697 5	0.278 8	0.277 7	*Si*	*Si*
orb3	1044	1242	1 135.200 0	1 310.266 7	36.036 5	43.714 9	5.393 8	10.336 7	0.268 4	0.286 4	*Si*	*Si*
orb4	1021	1147	1 058.366 7	1 209.200 0	21.854 8	34.301 0	5.408 9	10.529 0	0.259 2	0.284 5	*No*	*Si*
orb5	928	1067	980.766 7	1 118.266 7	30.097 3	33.602 5	5.366 5	10.476 9	0.285 2	0.280 5	*Si*	*Si*

Table 75: P_C =0.8, P_M =0.1, $\#Individuos = 50$

Instancia	$p - value$	Test
abz5	$1.436\,0 \cdot 10^{-11}$	u_test
abz6	$1.000\,0$	t_test
abz7	$1.000\,0$	t_test
abz8	$1.000\,0$	t_test
abz9	$1.000\,0$	t_test
la01	$1.587\,6 \cdot 10^{-11}$	u_test
la02	$1.000\,0$	t_test
la03	$1.000\,0$	t_test
la04	$1.000\,0$	t_test
la05	NaN	$t\_test(*)$
la06	$1.000\,0$	t_test
la29	$1.000\,0$	t_test
mt06	$0.245\,9$	u_test
mt10	$1.000\,0$	t_test
mt20	$1.000\,0$	t_test
orb1	$1.000\,0$	t_test
orb2	$1.000\,0$	t_test
orb3	$1.000\,0$	t_test
orb4	$1.436\,0 \cdot 10^{-11}$	u_test
orb5	$1.000\,0$	t_test

Table 76: P_C =0.8, P_M =0.1, $\#Individuos = 50$ $(*)\sigma_{X_1X_2} = 0$

4.12 Caso 12:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1248	1375	1 287.700 0	1 426.033 3	30.659 6	26.994 4	5.234 3	20.913 8	0.279 5	0.274 3	*Si*	*Si*
abz6	943	996	972.366 7	1 042.400 0	16.428 6	19.752 8	5.453 3	21.424 7	0.280 0	0.282 4	*Si*	*Si*
abz7	726	916	764.466 7	956.033 3	21.794 1	17.461 4	15.945 5	270.409 8	0.281 7	0.280 5	*Si*	*Si*
abz8	745	925	778.166 7	978.133 3	18.701 3	22.233 2	16.130 9	263.543 7	0.284 2	0.279 9	*Si*	*Si*
abz9	766	911	799.300 0	982.900 0	15.451 3	23.119 0	15.587 6	250.164 2	0.280 9	0.267 6	*Si*	*Si*
la01	666	688	667.400 0	698.366 7	4.386 3	12.408 3	2.723 4	4.420 1	0.140 1	0.211 1	*No*	*No*
la02	655	666	665.666 7	686.400 0	8.375 9	17.421 4	2.688 1	4.281 8	0.281 2	0.279 2	*Si*	*Si*
la03	597	617	615.866 7	650.200 0	12.945 4	14.164 3	2.634 1	4.378 0	0.278 4	0.279 7	*Si*	*Si*
la04	590	613	603.400 0	648.900 0	7.688 1	20.916 3	2.799 2	4.322 7	0.278 8	0.278 9	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.737 1	4.765 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.900 0	0.000 0	4.908 2	4.104 0	8.533 2	NaN	0.214 0	*Si*	*No*
la29	1254	1516	1 309.800 0	1 570.600 0	29.871 3	33.445 1	10.551 6	75.611 9	0.285 6	0.283 2	*Si*	*Si*
mt06	55	55	55.000 0	55.100 0	0.000 0	0.395 8	1.951 2	2.999 9	NaN	0.119 3	*Si*	*No*
mt10	976	1095	1 028.766 7	1 151.966 7	26.720 4	25.276 4	5.066 2	20.432 3	0.275 5	0.282 8	*Si*	*Si*
mt20	1182	1328	1 254.100 0	1 436.300 0	37.986 3	34.282 3	4.982 8	13.329 4	0.259 5	0.271 7	*No*	*Si*
orb1	1121	1245	1 172.866 7	1 300.600 0	30.421 2	33.960 4	5.232 4	20.426 2	0.287 6	0.286 6	*No*	*No*
orb2	909	965	938.066 7	1 022.533 3	17.196 8	29.156 7	5.258 8	20.511 0	0.278 3	0.278 2	*Si*	*Si*
orb3	1064	1213	1 134.033 3	1 257.600 0	36.573 7	27.955 4	5.098 4	20.205 6	0.276 5	0.283 3	*Si*	*Si*
orb4	1026	1105	1 056.533 3	1 161.766 7	15.478 4	31.560 2	5.186 8	20.545 0	0.279 7	0.280 4	*Si*	*Si*
orb5	909	1027	963.433 3	1 096.833 3	26.141 5	35.561 3	5.206 8	20.376 9	0.285 0	0.285 1	*Si*	*Si*

Table 77: P_C =0.7, P_M =0.01, $\#Individuos = 100$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$1.939\,4 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.001 0	u_test
la29	1.000 0	t_test
mt06	0.328 7	u_test
mt10	1.000 0	t_test
mt20	$1.587\,6 \cdot 10^{-11}$	u_test
orb1	$1.436\,0 \cdot 10^{-11}$	u_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 78: P_C =0.7, P_M =0.01, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.13 Caso 13:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1244	1348	1 280.766 7	1 421.900 0	22.156 5	26.930 0	5.466 3	20.995 5	0.280 4	0.275 0	*Si*	*Si*
abz6	943	999	971.066 7	1 039.100 0	17.274 1	20.970 4	5.643 4	20.909 5	0.280 5	0.283 4	*Si*	*Si*
abz7	724	910	757.866 7	948.333 3	16.814 1	17.012 4	17.080 9	255.927 1	0.284 7	0.281 6	*Si*	*Si*
abz8	740	927	772.433 3	977.766 7	19.236 6	21.115 1	17.008 1	255.610 9	0.281 8	0.280 1	*Si*	*Si*
abz9	776	945	805.333 3	981.200 0	15.098 2	18.416 3	16.427 0	268.608 1	0.274 1	0.284 2	*Si*	*Si*
la01	666	688	673.366 7	695.633 3	10.913 2	7.622 3	2.748 8	5.368 9	0.238 1	0.215 4	*No*	*No*
la02	655	664	671.366 7	677.833 3	12.098 2	12.482 2	2.753 2	4.603 3	0.258 9	0.264 4	*No*	*No*
la03	603	617	617.466 7	649.800 0	8.413 2	13.543 5	2.758 9	4.701 1	0.274 2	0.277 7	*Si*	*Si*
la04	590	618	600.133 3	653.833 3	7.112 1	22.496 0	3.058 5	4.745 8	0.276 2	0.278 8	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.776 5	5.227 0	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.466 7	0.000 0	5.713 9	4.002 9	10.247 2	NaN	0.167 0	*Si*	*No*
la29	1237	1494	1 311.666 7	1 568.100 0	28.217 4	33.236 9	10.975 2	80.696 1	0.274 8	0.280 3	*Si*	*Si*
mt06	55	55	55.066 7	55.133 3	0.359 0	0.561 7	2.188 8	3.195 0	0.089 8	0.112 7	*No*	*No*
mt10	976	1102	1 020.766 7	1 152.033 3	21.856 6	27.658 0	5.576 5	22.776 1	0.284 4	0.279 7	*Si*	*Si*
mt20	1188	1366	1 250.366 7	1 437.200 0	29.372 9	31.534 5	5.320 4	14.481 5	0.283 2	0.279 8	*Si*	*Si*
orb1	1090	1240	1 151.233 3	1 299.766 7	31.883 8	30.320 2	5.382 0	22.058 9	0.279 4	0.285 2	*Si*	*Si*
orb2	890	966	940.300 0	1 015.233 3	22.568 6	28.574 7	5.773 4	22.390 0	0.277 8	0.287 3	*Si*	*No*
orb3	1065	1204	1 124.066 7	1 288.633 3	31.978 0	37.902 1	5.486 3	21.858 9	0.282 0	0.280 7	*Si*	*Si*
orb4	1012	1128	1 062.333 3	1 176.300 0	23.990 7	24.377 8	5.569 9	22.110 3	0.281 0	0.277 4	*Si*	*Si*
orb5	905	1024	976.500 0	1 101.700 0	36.360 9	41.872 1	5.556 0	21.893 6	0.277 4	0.285 7	*Si*	*Si*

Table 79: P_C =0.8, P_M =0.01, $\#Individuos = 100$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$1.460\,8 \cdot 10^{-09}$	u_test
la02	0.014 1	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.003 9	u_test
la29	1.000 0	t_test
mt06	0.412 2	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	$8.066\,1 \cdot 10^{-11}$	u_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 80: P_C =0.8, P_M =0.01, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.14 Caso 14:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1245	1366	1 282.566 7	1 429.233 3	23.808 5	29.108 6	5.145 3	20.907 9	0.275 9	0.280 6	*Si*	*Si*
abz6	943	991	973.366 7	1 047.633 3	20.519 1	25.453 9	5.312 6	20.445 0	0.275 1	0.280 6	*Si*	*Si*
abz7	738	912	770.400 0	955.400 0	15.959 5	19.853 8	16.097 3	258.749 2	0.281 2	0.282 6	*Si*	*Si*
abz8	728	935	772.533 3	974.633 3	15.869 7	17.211 4	19.181 9	251.367 5	0.275 5	0.280 1	*Si*	*Si*
abz9	782	931	811.233 3	986.333 3	17.073 7	23.850 0	16.170 9	247.559 5	0.282 5	0.281 9	*Si*	*Si*
la01	666	688	671.533 3	698.766 7	9.333 6	10.852 6	2.756 8	4.405 3	0.221 5	0.192 5	*No*	*No*
la02	655	664	665.933 3	682.533 3	8.929 1	17.348 8	2.757 6	4.294 2	0.258 8	0.272 3	*No*	*Si*
la03	597	617	618.100 0	648.300 0	9.937 6	14.633 6	2.750 7	4.375 0	0.269 7	0.281 4	*Si*	*Si*
la04	590	613	600.966 7	650.733 3	9.502 6	20.972 9	2.761 2	4.306 1	0.256 9	0.281 5	*No*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.744 1	4.711 8	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	927.166 7	0.000 0	1.881 2	3.975 9	8.495 7	NaN	0.227 7	*Si*	*No*
la29	1264	1501	1 314.500 0	1 568.466 7	26.159 4	37.871 5	10.458 9	75.585 5	0.282 2	0.287 5	*Si*	*No*
mt06	55	55	55.100 0	55.133 3	0.538 5	0.426 9	2.054 5	3.067 4	0.089 8	0.143 2	*No*	*No*
mt10	971	1076	1 028.533 3	1 140.333 3	25.464 7	25.530 8	5.289 9	20.969 4	0.282 2	0.281 4	*Si*	*Si*
mt20	1178	1383	1 246.766 7	1 425.900 0	33.681 5	25.575 2	5.214 6	13.562 6	0.281 0	0.278 6	*Si*	*Si*
orb1	1113	1239	1 156.300 0	1 305.500 0	25.158 4	39.689 4	6.137 3	20.937 8	0.281 7	0.278 6	*Si*	*Si*
orb2	902	950	934.566 7	1 024.600 0	16.156 9	34.891 8	6.125 9	20.708 4	0.281 2	0.274 6	*Si*	*Si*
orb3	1065	1225	1 134.733 3	1 280.200 0	46.897 7	35.853 8	5.382 4	20.710 7	0.277 6	0.284 7	*Si*	*Si*
orb4	1024	1120	1 059.400 0	1 180.766 7	21.769 4	29.903 9	5.287 9	20.995 5	0.275 1	0.285 6	*Si*	*Si*
orb5	901	1040	970.966 7	1 107.500 0	30.303 4	35.008 3	5.397 2	21.352 2	0.279 7	0.273 7	*Si*	*Si*

Table 81: P_C =0.6, P_M =0.05, $\#Individuos = 100$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.886\,5 \cdot 10^{-11}$	u_test
la02	0.000 1	u_test
la03	1.000 0	t_test
la04	$3.517\,0 \cdot 10^{-11}$	u_test
la05	NaN	$t\_test(*)$
la06	0.007 4	u_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	0.336 7	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 82: P_C =0.6, P_M =0.05, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.15 Caso 15:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1240	1375	1 286.433 3	1 426.033 3	24.208 4	26.994 4	5.669 3	20.913 8	0.270 4	0.274 3	*Si*	*Si*
abz6	945	996	970.666 7	1 042.400 0	19.838 2	19.752 8	5.771 3	21.424 7	0.280 3	0.282 4	*Si*	*Si*
abz7	728	916	757.566 7	956.033 3	14.916 8	17.461 4	17.271 9	270.409 8	0.281 0	0.280 5	*Si*	*Si*
abz8	744	925	775.633 3	978.133 3	14.140 9	22.233 2	17.620 9	263.543 7	0.279 8	0.279 9	*Si*	*Si*
abz9	776	911	811.300 0	982.900 0	17.094 2	23.119 0	16.690 3	250.164 2	0.284 9	0.267 6	*Si*	*Si*
la01	666	688	670.366 7	698.366 7	7.180 9	12.408 3	2.817 2	4.420 1	0.227 4	0.211 1	*No*	*No*
la02	655	666	667.000 0	686.400 0	11.980 5	17.421 4	2.808 6	4.281 8	0.240 4	0.279 2	*No*	*Si*
la03	597	617	615.266 7	650.200 0	11.275 1	14.164 3	2.832 4	4.378 0	0.271 5	0.279 7	*Si*	*Si*
la04	590	613	602.733 3	648.900 0	7.650 4	20.916 3	2.822 7	4.322 7	0.280 9	0.278 9	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.818 3	4.765 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.900 0	0.000 0	4.908 2	4.081 5	8.533 2	NaN	0.214 0	*Si*	*No*
la29	1259	1516	1 321.000 0	1 570.600 0	36.370 3	33.445 1	10.783 7	75.611 9	0.284 9	0.283 2	*Si*	*Si*
mt06	55	55	55.066 7	55.100 0	0.359 0	0.395 8	2.630 0	2.999 9	0.089 8	0.119 3	*No*	*No*
mt10	975	1095	1 036.133 3	1 151.966 7	31.876 6	25.276 4	5.430 1	20.432 3	0.283 5	0.282 8	*Si*	*Si*
mt20	1204	1328	1 252.366 7	1 436.300 0	31.292 7	34.282 3	5.328 9	13.329 4	0.274 9	0.271 7	*Si*	*Si*
orb1	1111	1245	1 159.766 7	1 300.600 0	31.275 9	33.960 4	5.476 7	20.426 2	0.275 1	0.286 6	*Si*	*No*
orb2	900	965	936.066 7	1 022.533 3	19.134 5	29.156 7	5.508 8	20.511 0	0.271 3	0.278 2	*Si*	*Si*
orb3	1070	1213	1 137.966 7	1 257.600 0	30.285 8	27.955 4	6.277 6	20.205 6	0.277 5	0.283 3	*Si*	*Si*
orb4	1030	1105	1 057.666 7	1 161.766 7	17.686 8	31.560 2	5.476 1	20.545 0	0.281 0	0.280 4	*Si*	*Si*
orb5	904	1027	967.433 3	1 096.833 3	33.135 8	35.561 3	5.539 9	20.376 9	0.284 3	0.285 1	*Si*	*Si*

Table 83: P_C =0.7, P_M =0.05, $\#Individuos = 100$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$3.517\,0 \cdot 10^{-11}$	u_test
la02	$2.058\,9 \cdot 10^{-06}$	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.001 0	u_test
la29	1.000 0	t_test
mt06	0.415 1	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	$1.436\,0 \cdot 10^{-11}$	u_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 84: P_C =0.7, P_M =0.05, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.16 Caso 16:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1244	1348	1 288.533 3	1 421.900 0	22.236 2	26.930 0	5.456 5	20.995 5	0.273 0	0.275 0	*Si*	*Si*
abz6	947	999	975.333 3	1 039.100 0	16.914 2	20.970 4	5.607 7	20.909 5	0.284 4	0.283 4	*Si*	*Si*
abz7	741	910	762.400 0	948.333 3	15.003 6	17.012 4	16.809 4	255.927 1	0.280 2	0.281 6	*Si*	*Si*
abz8	753	927	773.666 7	977.766 7	13.211 9	21.115 1	16.806 0	255.610 9	0.283 6	0.280 1	*Si*	*Si*
abz9	768	945	804.400 0	981.200 0	19.137 4	18.416 3	16.479 2	268.608 1	0.283 4	0.284 2	*Si*	*Si*
la01	666	688	670.800 0	695.633 3	8.565 0	7.622 3	2.862 7	5.368 9	0.216 9	0.215 4	*No*	*No*
la02	655	664	667.900 0	677.833 3	9.627 6	12.482 2	2.871 4	4.603 3	0.261 7	0.264 4	*No*	*No*
la03	597	617	616.100 0	649.800 0	11.936 9	13.543 5	2.760 7	4.701 1	0.271 5	0.277 7	*Si*	*Si*
la04	590	618	601.233 3	653.833 3	8.313 4	22.496 0	2.771 9	4.745 8	0.280 5	0.278 8	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.868 8	5.227 0	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.466 7	0.000 0	5.713 9	4.229 1	10.247 2	NaN	0.167 0	*Si*	*No*
la29	1269	1494	1 318.400 0	1 568.100 0	24.789 2	33.236 9	10.658 3	80.696 1	0.278 2	0.280 3	*Si*	*Si*
mt06	55	55	55.066 7	55.133 3	0.359 0	0.561 7	2.130 6	3.195 0	0.089 8	0.112 7	*No*	*No*
mt10	943	1102	1 028.833 3	1 152.033 3	34.331 8	27.658 0	5.525 2	22.776 1	0.279 3	0.279 7	*Si*	*Si*
mt20	1202	1366	1 252.966 7	1 437.200 0	30.905 8	31.534 5	5.293 9	14.481 5	0.271 9	0.279 8	*Si*	*Si*
orb1	1118	1240	1 169.533 3	1 299.766 7	27.466 0	30.320 2	5.356 5	22.058 9	0.286 5	0.285 2	*Si*	*Si*
orb2	893	966	931.700 0	1 015.233 3	20.576 9	28.574 7	5.403 8	22.390 0	0.284 9	0.287 3	*Si*	*No*
orb3	1068	1204	1 135.566 7	1 288.633 3	34.591 6	37.902 1	5.524 6	21.858 9	0.275 5	0.280 7	*Si*	*Si*
orb4	1025	1128	1 060.833 3	1 176.300 0	20.451 7	24.377 8	5.591 4	22.110 3	0.285 8	0.277 4	*Si*	*Si*
orb5	915	1024	979.300 0	1 101.700 0	34.874 2	41.872 1	5.393 8	21.893 6	0.278 8	0.285 7	*Si*	*Si*

Table 85: P_C =0.8, P_M =0.05, $\#Individuos = 100$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$6.329\,0 \cdot 10^{-11}$	u_test
la02	0.001 9	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.003 9	u_test
la29	1.000 0	t_test
mt06	0.412 2	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	$1.754\,9 \cdot 10^{-11}$	u_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 86: P_C =0.8, P_M =0.05, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.17 Caso 17:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1244	1366	1 280.900 0	1 429.233 3	24.897 6	29.108 6	4.790 5	20.907 9	0.283 4	0.280 6	*Si*	*Si*
abz6	947	991	973.733 3	1 047.633 3	14.573 8	25.453 9	4.926 5	20.445 0	0.263 1	0.280 6	*No*	*Si*
abz7	729	912	763.566 7	955.400 0	19.415 9	19.853 8	15.087 3	258.749 2	0.280 1	0.282 6	*Si*	*Si*
abz8	748	935	772.366 7	974.633 3	14.281 7	17.211 4	14.757 4	251.367 5	0.285 3	0.280 1	*Si*	*Si*
abz9	780	931	809.266 7	986.333 3	16.810 6	23.850 0	15.167 4	247.559 5	0.281 6	0.281 9	*Si*	*Si*
la01	666	688	669.633 3	698.766 7	7.512 1	10.852 6	2.572 9	4.405 3	0.195 2	0.192 5	*No*	*No*
la02	655	664	664.866 7	682.533 3	7.671 3	17.348 8	2.563 4	4.294 2	0.272 7	0.272 3	*Si*	*Si*
la03	597	617	615.366 7	648.300 0	9.806 4	14.633 6	2.505 6	4.375 0	0.272 0	0.281 4	*Si*	*Si*
la04	590	613	603.066 7	650.733 3	9.423 1	20.972 9	2.479 7	4.306 1	0.272 3	0.281 5	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.473 0	4.711 8	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	927.166 7	0.000 0	1.881 2	3.578 2	8.495 7	NaN	0.227 7	*Si*	*No*
la29	1240	1501	1 317.400 0	1 568.466 7	34.157 1	37.871 5	9.870 9	75.585 5	0.282 4	0.287 5	*Si*	*No*
mt06	55	55	55.133 3	55.133 3	0.498 9	0.426 9	1.956 2	3.067 4	0.124 7	0.143 2	*No*	*No*
mt10	976	1076	1 022.933 3	1 140.333 3	22.397 8	25.530 8	5.415 1	20.969 4	0.283 2	0.281 4	*Si*	*Si*
mt20	1178	1383	1 253.000 0	1 425.900 0	33.842 8	25.575 2	4.923 3	13.562 6	0.261 9	0.278 6	*No*	*Si*
orb1	1121	1239	1 161.266 7	1 305.500 0	20.950 6	39.689 4	5.054 7	20.937 8	0.280 4	0.278 6	*Si*	*Si*
orb2	894	950	937.400 0	1 024.600 0	22.040 3	34.891 8	5.082 4	20.708 4	0.280 6	0.274 6	*Si*	*Si*
orb3	1062	1225	1 135.433 3	1 280.200 0	37.664 9	35.853 8	5.044 7	20.710 7	0.281 2	0.284 7	*Si*	*Si*
orb4	1017	1120	1 059.833 3	1 180.766 7	17.759 7	29.903 9	5.078 1	20.995 5	0.282 4	0.285 6	*Si*	*Si*
orb5	891	1040	969.766 7	1 107.500 0	38.721 0	35.008 3	5.178 7	21.352 2	0.284 8	0.273 7	*Si*	*Si*

Table 87: P_C =0.6, P_M =0.1, $\#Individuos = 100$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	$3.694\,5 \cdot 10^{-11}$	u_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.142\,8 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.007 4	u_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	0.423 8	u_test
mt10	1.000 0	t_test
mt20	$1.436\,0 \cdot 10^{-11}$	u_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 88: P_C =0.6, P_M =0.1, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.18 Caso 18:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1238	1375	1 279.933 3	1 426.033 3	22.697 9	26.994 4	5.312 6	20.913 8	0.282 6	0.274 3	*Si*	*Si*
abz6	947	996	971.733 3	1 042.400 0	17.546 0	19.752 8	5.225 1	21.424 7	0.277 8	0.282 4	*Si*	*Si*
abz7	739	916	762.800 0	956.033 3	17.413 4	17.461 4	15.949 1	270.409 8	0.264 9	0.280 5	*No*	*Si*
abz8	735	925	775.100 0	978.133 3	16.666 0	22.233 2	15.643 0	263.543 7	0.283 6	0.279 9	*Si*	*Si*
abz9	771	911	807.166 7	982.900 0	19.285 7	23.119 0	15.570 3	250.164 2	0.285 0	0.267 6	*Si*	*Si*
la01	666	688	669.266 7	698.366 7	7.775 7	12.408 3	2.617 8	4.420 1	0.178 6	0.211 1	*No*	*No*
la02	655	666	667.966 7	686.400 0	8.788 2	17.421 4	2.712 1	4.281 8	0.274 8	0.279 2	*Si*	*Si*
la03	597	617	616.466 7	650.200 0	13.283 4	14.164 3	2.767 1	4.378 0	0.277 5	0.279 7	*Si*	*Si*
la04	590	613	600.900 0	648.900 0	7.892 4	20.916 3	2.650 6	4.322 7	0.275 0	0.278 9	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.622 4	4.765 5	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.900 0	0.000 0	4.908 2	3.836 9	8.533 2	NaN	0.214 0	*Si*	*No*
la29	1261	1516	1 334.200 0	1 570.600 0	31.162 4	33.445 1	10.038 5	75.611 9	0.280 6	0.283 2	*Si*	*Si*
mt06	55	55	55.133 3	55.100 0	0.498 9	0.395 8	2.035 7	2.999 9	0.124 7	0.119 3	*No*	*No*
mt10	969	1095	1 029.500 0	1 151.966 7	27.671 6	25.276 4	5.530 3	20.432 3	0.282 0	0.282 8	*Si*	*Si*
mt20	1182	1328	1 244.366 7	1 436.300 0	25.644 3	34.282 3	4.992 9	13.329 4	0.273 8	0.271 7	*Si*	*Si*
orb1	1133	1245	1 169.266 7	1 300.600 0	23.292 2	33.960 4	5.245 9	20.426 2	0.284 6	0.286 6	*Si*	*No*
orb2	898	965	933.733 3	1 022.533 3	25.739 6	29.156 7	5.366 1	20.511 0	0.269 8	0.278 2	*Si*	*Si*
orb3	1043	1213	1 138.333 3	1 257.600 0	45.252 9	27.955 4	5.119 2	20.205 6	0.282 2	0.283 3	*Si*	*Si*
orb4	1012	1105	1 058.066 7	1 161.766 7	23.487 5	31.560 2	5.075 7	20.545 0	0.277 4	0.280 4	*Si*	*Si*
orb5	947	1027	984.666 7	1 096.833 3	24.913 6	35.561 3	5.262 0	20.376 9	0.286 8	0.285 1	*No*	*Si*

Table 89: P_C =0.7, P_M =0.1, $\#Individuos = 100$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	$1.436\,0 \cdot 10^{-11}$	u_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$6.329\,0 \cdot 10^{-11}$	u_test
la02	1.000 0	t_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.001 0	u_test
la29	1.000 0	t_test
mt06	0.505 9	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	$1.436\,0 \cdot 10^{-11}$	u_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	$1.587\,6 \cdot 10^{-11}$	u_test

Table 90: P_C =0.7, P_M =0.1, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.19 Caso 19:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1234	1348	1 284.466 7	1 421.900 0	24.278 6	26.930 0	5.903 1	20.995 5	0.276 0	0.275 0	*Si*	*Si*
abz6	943	999	973.500 0	1 039.100 0	18.288 0	20.970 4	5.788 0	20.909 5	0.281 2	0.283 4	*Si*	*Si*
abz7	732	910	760.000 0	948.333 3	14.475 3	17.012 4	18.416 5	255.927 1	0.284 8	0.281 6	*Si*	*Si*
abz8	752	927	774.800 0	977.766 7	14.048 5	21.115 1	17.889 9	255.610 9	0.275 9	0.280 1	*Si*	*Si*
abz9	783	945	812.833 3	981.200 0	21.136 2	18.416 3	18.599 2	268.608 1	0.273 5	0.284 2	*Si*	*Si*
la01	666	688	669.200 0	695.633 3	7.391 0	7.622 3	2.964 2	5.368 9	0.181 5	0.215 4	*No*	*No*
la02	655	664	669.266 7	677.833 3	11.809 4	12.482 2	2.972 7	4.603 3	0.264 9	0.264 4	*No*	*No*
la03	603	617	614.900 0	649.800 0	9.883 8	13.543 5	2.961 0	4.701 1	0.272 1	0.277 7	*Si*	*Si*
la04	590	618	602.700 0	653.833 3	7.699 1	22.496 0	2.967 6	4.745 8	0.279 6	0.278 8	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.944 7	5.227 0	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	928.466 7	0.000 0	5.713 9	4.522 7	10.247 2	NaN	0.167 0	*Si*	*No*
la29	1238	1494	1 307.933 3	1 568.100 0	32.195 2	33.236 9	12.248 1	80.696 1	0.283 1	0.280 3	*Si*	*Si*
mt06	55	55	55.233 3	55.133 3	0.715 7	0.561 7	2.195 7	3.195 0	0.148 3	0.112 7	*No*	*No*
mt10	976	1102	1 024.066 7	1 152.033 3	21.102 8	27.658 0	5.766 6	22.776 1	0.277 1	0.279 7	*Si*	*Si*
mt20	1207	1366	1 264.100 0	1 437.200 0	33.362 0	31.534 5	5.871 5	14.481 5	0.281 8	0.279 8	*Si*	*Si*
orb1	1103	1240	1 157.266 7	1 299.766 7	27.641 7	30.320 2	5.807 1	22.058 9	0.279 7	0.285 2	*Si*	*Si*
orb2	916	966	934.166 7	1 015.233 3	14.147 0	28.574 7	6.248 3	22.390 0	0.251 8	0.287 3	*No*	*No*
orb3	1052	1204	1 139.566 7	1 288.633 3	46.875 5	37.902 1	6.323 6	21.858 9	0.273 1	0.280 7	*Si*	*Si*
orb4	1022	1128	1 064.033 3	1 176.300 0	20.054 1	24.377 8	5.810 6	22.110 3	0.280 8	0.277 4	*Si*	*Si*
orb5	904	1024	953.533 3	1 101.700 0	29.858 3	41.872 1	5.859 3	21.893 6	0.279 1	0.285 7	*Si*	*Si*

Table 91: P_C =0.8, P_M =0.1, $\#Individuos = 100$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$4.722\,5 \cdot 10^{-11}$	u_test
la02	0.007 8	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.003 9	u_test
la29	1.000 0	t_test
mt06	0.590 6	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	$2.614\,2 \cdot 10^{-11}$	u_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 92: P_C =0.8, P_M =0.1, $\#Individuos = 100$ $(*)\sigma_{X_1X_2} = 0$

4.20 Caso 20:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1244	1357	1 294.100 0	1 405.300 0	28.761 5	24.257 2	5.583 5	41.136 4	0.283 7	0.286 1	*Si*	*Si*
abz6	951	984	974.366 7	1 020.333 3	13.141 5	16.563 7	5.543 4	40.583 7	0.264 3	0.285 1	*No*	*Si*
abz7	725	888	760.800 0	930.666 7	17.388 5	17.980 2	16.234 0	523.973 3	0.284 5	0.281 0	*Si*	*Si*
abz8	754	912	780.566 7	947.766 7	16.167 2	19.578 4	15.887 6	538.537 1	0.283 5	0.280 3	*Si*	*Si*
abz9	774	913	808.933 3	949.566 7	16.447 8	17.642 2	16.028 4	498.601 1	0.275 9	0.286 3	*Si*	*Si*
la01	666	688	669.266 7	694.133 3	7.361 8	3.403 3	2.889 6	10.390 3	0.181 7	0.201 1	*No*	*No*
la02	655	655	670.033 3	673.566 7	15.335 1	12.553 0	2.825 5	9.540 2	0.239 6	0.243 5	*No*	*No*
la03	597	617	620.400 0	643.100 0	11.386 0	11.866 9	2.728 3	11.011 2	0.266 9	0.266 6	*Si*	*Si*
la04	590	613	600.866 7	637.833 3	7.477 7	17.905 5	2.834 1	9.760 0	0.279 6	0.278 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.828 5	10.690 6	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.466 7	0.000 0	1.857 1	4.086 6	18.700 5	NaN	0.118 5	*Si*	*No*
la29	1268	1430	1 321.333 3	1 515.666 7	26.384 8	37.481 0	10.455 9	157.938 8	0.284 9	0.284 6	*Si*	*Si*
mt06	55	55	55.166 7	55.033 3	0.636 8	0.179 5	2.094 6	6.536 7	0.123 0	0.089 8	*No*	*No*
mt10	963	1069	1 021.233 3	1 117.433 3	25.458 0	21.116 6	5.359 5	44.895 5	0.270 4	0.281 8	*Si*	*Si*
mt20	1196	1335	1 254.733 3	1 399.033 3	32.099 8	29.300 2	5.085 3	28.741 0	0.274 0	0.271 9	*Si*	*Si*
orb1	1091	1203	1 166.633 3	1 265.066 7	26.765 0	28.677 4	5.363 7	42.552 6	0.276 6	0.283 0	*Si*	*Si*
orb2	909	947	941.566 7	1 003.200 0	18.541 3	26.010 8	5.369 7	43.313 2	0.285 3	0.282 7	*Si*	*Si*
orb3	1065	1165	1 129.433 3	1 227.833 3	44.841 7	25.543 5	5.382 4	42.521 5	0.279 0	0.266 3	*Si*	*Si*
orb4	1033	1097	1 070.733 3	1 142.666 7	24.009 6	18.192 2	5.371 0	42.833 8	0.277 7	0.277 5	*Si*	*Si*
orb5	915	1030	991.133 3	1 075.533 3	38.799 3	22.454 0	5.370 4	40.051 7	0.282 7	0.279 3	*Si*	*Si*

Table 93: P_C =0.7, P_M =0.01, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	$9.323\,6 \cdot 10^{-11}$	u_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$3.880\,9 \cdot 10^{-11}$	u_test
la02	0.115 5	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.252 9	u_test
la29	1.000 0	t_test
mt06	0.593 5	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 94: P_C =0.7, P_M =0.01, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.21 Caso 21:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1249	1353	1 288.533 3	1 412.533 3	19.464 0	23.096 5	5.684 7	43.187 2	0.279 8	0.278 4	*Si*	*Si*
abz6	948	965	974.266 7	1 015.266 7	17.738 7	24.679 2	5.829 1	41.688 9	0.279 6	0.277 7	*Si*	*Si*
abz7	740	881	766.466 7	925.133 3	14.990 5	15.059 3	17.278 1	522.295 9	0.277 6	0.272 8	*Si*	*Si*
abz8	745	915	775.000 0	946.000 0	14.413 0	21.068 1	17.274 7	522.351 3	0.284 9	0.283 2	*Si*	*Si*
abz9	777	898	813.233 3	957.466 7	21.769 5	18.707 8	17.630 6	507.136 8	0.286 3	0.271 2	*Si*	*Si*
la01	666	688	669.900 0	696.333 3	7.687 0	8.332 0	3.109 5	8.808 3	0.204 7	0.174 2	*No*	*No*
la02	655	657	666.933 3	673.333 3	9.204 8	16.034 0	3.048 7	8.502 8	0.276 2	0.217 2	*Si*	*No*
la03	597	630	616.766 7	645.266 7	12.333 4	11.667 4	3.035 6	8.655 7	0.281 3	0.272 8	*Si*	*Si*
la04	598	611	605.200 0	636.066 7	5.764 3	17.650 2	3.016 4	8.563 8	0.276 2	0.274 2	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	3.053 0	9.549 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.333 3	0.000 0	1.795 1	4.341 4	17.203 5	NaN	0.089 8	*Si*	*No*
la29	1278	1469	1 324.366 7	1 521.633 3	30.122 5	31.610 6	11.395 9	148.279 0	0.285 1	0.284 4	*Si*	*Si*
mt06	55	55	55.000 0	55.033 3	0.000 0	0.179 5	2.265 0	5.912 0	NaN	0.089 8	*Si*	*No*
mt10	962	1077	1 033.500 0	1 116.066 7	34.093 7	21.176 9	5.731 3	40.161 6	0.281 0	0.281 0	*Si*	*Si*
mt20	1196	1364	1 258.666 7	1 410.133 3	39.179 4	26.724 2	5.806 5	26.265 1	0.277 2	0.281 6	*Si*	*Si*
orb1	1114	1189	1 174.066 7	1 263.000 0	30.639 8	29.607 4	5.737 9	40.591 3	0.285 2	0.278 3	*Si*	*Si*
orb2	900	933	936.566 7	993.200 0	15.493 4	25.718 2	5.788 4	40.646 2	0.276 3	0.279 2	*Si*	*Si*
orb3	1072	1204	1 146.133 3	1 246.466 7	42.813 3	28.238 0	5.742 7	41.279 8	0.274 6	0.281 6	*Si*	*Si*
orb4	1033	1100	1 064.133 3	1 148.166 7	21.914 6	16.484 5	5.754 8	40.194 7	0.280 3	0.275 5	*Si*	*Si*
orb5	913	1035	968.966 7	1 077.066 7	30.525 9	26.135 5	5.822 1	40.209 9	0.285 5	0.278 7	*Si*	*Si*

Table 95: P_C =0.8, P_M =0.01, $\#Individuos = 200$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.614\,2 \cdot 10^{-11}$	u_test
la02	0.130 6	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.412 2	u_test
la29	1.000 0	t_test
mt06	0.412 2	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 96: P_C =0.8, P_M =0.01, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.22 Caso 22:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1254	1348	1 289.700 0	1 404.833 3	25.504 4	27.349 7	5.488 8	40.971 9	0.272 1	0.279 7	*Si*	*Si*
abz6	943	976	969.866 7	1 015.866 7	18.835 7	24.902 1	5.417 8	40.646 9	0.267 2	0.280 5	*Si*	*Si*
abz7	736	897	764.933 3	929.566 7	14.479 7	16.742 5	19.183 3	510.979 5	0.281 2	0.283 1	*Si*	*Si*
abz8	758	908	780.933 3	946.200 0	15.329 6	19.530 1	15.859 4	503.741 5	0.276 2	0.284 1	*Si*	*Si*
abz9	779	912	812.666 7	949.566 7	19.851 7	20.571 3	16.017 0	489.697 6	0.284 3	0.286 5	*Si*	*Si*
la01	666	688	669.566 7	695.266 7	7.088 4	7.580 4	2.793 4	8.945 2	0.204 0	0.140 9	*No*	*No*
la02	655	664	670.300 0	672.566 7	11.981 0	9.478 7	2.805 4	8.689 2	0.254 1	0.245 6	*No*	*No*
la03	603	635	619.100 0	643.500 0	9.360 7	9.236 7	2.778 7	8.764 6	0.272 4	0.266 6	*Si*	*Si*
la04	590	613	602.633 3	641.666 7	7.993 7	17.428 6	3.004 8	8.864 3	0.282 4	0.285 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.771 5	9.632 7	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.366 7	0.000 0	1.016 0	3.967 1	17.804 6	NaN	0.161 3	*Si*	*No*
la29	1256	1445	1 313.166 7	1 508.166 7	32.485 0	35.318 6	10.235 4	148.166 1	0.277 8	0.279 4	*Si*	*Si*
mt06	55	55	55.066 7	55.033 3	0.359 0	0.179 5	2.083 4	6.169 1	0.089 8	0.089 8	*No*	*No*
mt10	953	1077	1 029.566 7	1 121.766 7	33.765 5	27.572 6	5.810 3	42.207 7	0.284 1	0.283 4	*Si*	*Si*
mt20	1198	1341	1 259.700 0	1 411.100 0	37.216 6	28.670 9	5.660 9	26.394 8	0.279 1	0.281 5	*Si*	*Si*
orb1	1106	1183	1 166.866 7	1 265.766 7	26.117 3	26.318 2	6.531 1	40.512 3	0.282 5	0.270 7	*Si*	*Si*
orb2	902	957	944.033 3	1 002.400 0	23.225 7	26.730 3	5.631 8	41.082 2	0.277 8	0.276 5	*Si*	*Si*
orb3	1060	1173	1 149.800 0	1 244.500 0	46.247 5	34.390 6	5.558 8	39.885 7	0.278 5	0.284 4	*Si*	*Si*
orb4	1029	1117	1 059.766 7	1 150.100 0	22.697 6	19.620 3	5.520 7	41.016 2	0.269 5	0.280 9	*Si*	*Si*
orb5	926	1033	980.333 3	1 080.166 7	35.047 0	23.983 4	5.489 0	41.315 2	0.276 4	0.285 5	*Si*	*Si*

Table 97: P_C =0.6, P_M =0.05, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.614\,2 \cdot 10^{-11}$	u_test
la02	0.392 2	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.187 5	u_test
la29	1.000 0	t_test
mt06	0.502 9	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 98: P_C =0.6, P_M =0.05, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.23 Caso 23:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1239	1357	1 290.133 3	1 405.300 0	35.248 4	24.257 2	5.524 9	41.136 4	0.261 4	0.286 1	*No*	*Si*
abz6	943	984	977.933 3	1 020.333 3	17.678 5	16.563 7	5.745 0	40.583 7	0.275 6	0.285 1	*Si*	*Si*
abz7	728	888	770.333 3	930.666 7	18.456 0	17.980 2	17.451 9	523.973 3	0.279 8	0.281 0	*Si*	*Si*
abz8	753	912	778.233 3	947.766 7	15.632 6	19.578 4	18.286 1	538.537 1	0.279 8	0.280 3	*Si*	*Si*
abz9	777	913	812.500 0	949.566 7	21.222 2	17.642 2	17.808 9	498.601 1	0.258 8	0.286 3	*No*	*Si*
la01	666	688	671.766 7	694.133 3	8.762 4	3.403 3	3.001 8	10.390 3	0.236 4	0.201 1	*No*	*No*
la02	655	655	667.400 0	673.566 7	9.769 3	12.553 0	3.312 6	9.540 2	0.247 5	0.243 5	*No*	*No*
la03	597	617	619.966 7	643.100 0	8.158 8	11.866 9	2.922 3	11.011 2	0.262 1	0.266 6	*No*	*Si*
la04	590	613	598.433 3	637.833 3	7.437 2	17.905 5	2.946 1	9.760 0	0.267 1	0.278 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.952 2	10.690 6	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.466 7	0.000 0	1.857 1	4.413 5	18.700 5	NaN	0.118 5	*Si*	*No*
la29	1272	1430	1 333.600 0	1 515.666 7	29.603 6	37.481 0	10.883 8	157.938 8	0.277 1	0.284 6	*Si*	*Si*
mt06	55	55	55.000 0	55.033 3	0.000 0	0.179 5	2.185 9	6.536 7	NaN	0.089 8	*Si*	*No*
mt10	967	1069	1 030.266 7	1 117.433 3	30.159 5	21.116 6	5.678 9	44.895 5	0.284 2	0.281 8	*Si*	*Si*
mt20	1200	1335	1 256.933 3	1 399.033 3	25.446 6	29.300 2	5.526 7	28.741 0	0.282 5	0.271 9	*Si*	*Si*
orb1	1099	1203	1 155.600 0	1 265.066 7	31.257 6	28.677 4	5.551 7	42.552 6	0.284 1	0.283 0	*Si*	*Si*
orb2	901	947	942.033 3	1 003.200 0	24.915 2	26.010 8	5.570 8	43.313 2	0.280 0	0.282 7	*Si*	*Si*
orb3	1064	1165	1 124.700 0	1 227.833 3	39.633 4	25.543 5	5.535 7	42.521 5	0.278 7	0.266 3	*Si*	*Si*
orb4	1019	1097	1 064.433 3	1 142.666 7	23.686 4	18.192 2	5.604 5	42.833 8	0.281 3	0.277 5	*Si*	*Si*
orb5	927	1030	986.366 7	1 075.533 3	28.741 9	22.454 0	5.562 2	40.051 7	0.279 8	0.279 3	*Si*	*Si*

Table 99: P_C =0.7, P_M =0.05, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	$8.465\,7 \cdot 10^{-11}$	u_test
abz6	$1.000\,0$	t_test
abz7	$1.000\,0$	t_test
abz8	$1.000\,0$	t_test
abz9	$1.436\,0 \cdot 10^{-11}$	u_test
la01	$6.329\,0 \cdot 10^{-11}$	u_test
la02	$0.089\,3$	u_test
la03	$1.016\,9 \cdot 10^{-09}$	u_test
la04	$1.000\,0$	t_test
la05	NaN	$t\_test(*)$
la06	$0.252\,9$	u_test
la29	$1.000\,0$	t_test
mt06	$0.412\,2$	u_test
mt10	$1.000\,0$	t_test
mt20	$1.000\,0$	t_test
orb1	$1.000\,0$	t_test
orb2	$1.000\,0$	t_test
orb3	$1.000\,0$	t_test
orb4	$1.000\,0$	t_test
orb5	$1.000\,0$	t_test

Table 100: P_C =0.7, P_M =0.05, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.24 Caso 24:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1249	1353	1 287.633 3	1 412.533 3	25.334 4	23.096 5	6.044 1	43.187 2	0.269 4	0.278 4	*Si*	*Si*
abz6	947	965	973.966 7	1 015.266 7	16.920 4	24.679 2	6.011 6	41.688 9	0.284 1	0.277 7	*Si*	*Si*
abz7	726	881	769.000 0	925.133 3	17.942 5	15.059 3	19.612 5	522.295 9	0.280 4	0.272 8	*Si*	*Si*
abz8	735	915	778.300 0	946.000 0	18.954 6	21.068 1	19.045 8	522.351 3	0.282 0	0.283 2	*Si*	*Si*
abz9	765	898	813.866 7	957.466 7	21.200 2	18.707 8	19.302 5	507.136 8	0.279 2	0.271 2	*Si*	*Si*
la01	666	688	668.600 0	696.333 3	6.601 0	8.332 0	3.205 1	8.808 3	0.171 7	0.174 2	*No*	*No*
la02	655	657	665.966 7	673.333 3	7.082 8	16.034 0	3.307 9	8.502 8	0.282 9	0.217 2	*Si*	*No*
la03	597	630	619.733 3	645.266 7	14.968 7	11.667 4	3.191 8	8.655 7	0.257 9	0.272 8	*No*	*Si*
la04	590	611	602.400 0	636.066 7	9.652 6	17.650 2	3.226 5	8.563 8	0.264 3	0.274 2	*No*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	3.307 3	9.549 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.333 3	0.000 0	1.795 1	4.462 0	17.203 5	NaN	0.089 8	*Si*	*No*
la29	1217	1469	1 318.533 3	1 521.633 3	30.325 7	31.610 6	11.834 9	148.279 0	0.257 8	0.284 4	*No*	*Si*
mt06	55	55	55.166 7	55.033 3	0.636 8	0.179 5	2.376 2	5.912 0	0.123 0	0.089 8	*No*	*No*
mt10	982	1077	1 031.466 7	1 116.066 7	32.882 3	21.176 9	6.088 5	40.161 6	0.277 0	0.281 0	*Si*	*Si*
mt20	1190	1364	1 249.466 7	1 410.133 3	23.259 0	26.724 2	6.037 3	26.265 1	0.281 5	0.281 6	*Si*	*Si*
orb1	1108	1189	1 167.266 7	1 263.000 0	32.930 2	29.607 4	5.982 4	40.591 3	0.283 3	0.278 3	*Si*	*Si*
orb2	911	933	935.700 0	993.200 0	15.282 1	25.718 2	5.955 7	40.646 2	0.280 9	0.279 2	*Si*	*Si*
orb3	1039	1204	1 135.700 0	1 246.466 7	34.760 3	28.238 0	6.039 7	41.279 8	0.277 1	0.281 6	*Si*	*Si*
orb4	1043	1100	1 067.200 0	1 148.166 7	18.501 2	16.484 5	5.973 7	40.194 7	0.255 4	0.275 5	*No*	*Si*
orb5	914	1035	974.966 7	1 077.066 7	33.970 1	26.135 5	6.202 0	40.209 9	0.285 8	0.278 7	*Si*	*Si*

Table 101: P_C =0.8, P_M =0.05, $\#Individuos = 200$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$2.252\,2 \cdot 10^{-11}$	u_test
la02	0.029 2	u_test
la03	$7.147\,1 \cdot 10^{-09}$	u_test
la04	$1.656\,4 \cdot 10^{-10}$	u_test
la05	NaN	$t\_test(*)$
la06	0.412 2	u_test
la29	$1.436\,0 \cdot 10^{-11}$	u_test
mt06	0.593 5	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	$2.886\,5 \cdot 10^{-11}$	u_test
orb5	1.000 0	t_test

Table 102: P_C =0.8, P_M =0.05, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.25 Caso 25:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1242	1348	1 292.133 3	1 404.833 3	25.151 2	27.349 7	5.264 4	40.971 9	0.278 4	0.279 7	*Si*	*Si*
abz6	945	976	982.733 3	1 015.866 7	22.538 8	24.902 1	5.841 5	40.646 9	0.285 9	0.280 5	*Si*	*Si*
abz7	729	897	764.566 7	929.566 7	18.672 1	16.742 5	16.259 3	510.979 5	0.283 4	0.283 1	*Si*	*Si*
abz8	750	908	783.200 0	946.200 0	20.341 1	19.530 1	15.961 7	503.741 5	0.266 0	0.284 1	*No*	*Si*
abz9	779	912	816.366 7	949.566 7	17.482 3	20.571 3	16.303 9	489.697 6	0.276 8	0.286 5	*Si*	*Si*
la01	666	688	668.400 0	695.266 7	6.550 3	7.580 4	2.759 4	8.945 2	0.161 1	0.140 9	*No*	*No*
la02	655	664	669.333 3	672.566 7	13.369 9	9.478 7	2.804 0	8.689 2	0.257 0	0.245 6	*No*	*No*
la03	597	635	617.966 7	643.500 0	11.473 1	9.236 7	2.806 9	8.764 6	0.281 1	0.266 6	*Si*	*Si*
la04	590	613	602.500 0	641.666 7	8.118 9	17.428 6	3.262 7	8.864 3	0.281 6	0.285 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.762 7	9.632 7	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.366 7	0.000 0	1.016 0	3.961 9	17.804 6	NaN	0.161 3	*Si*	*No*
la29	1265	1445	1 321.366 7	1 508.166 7	30.698 0	35.318 6	10.431 6	148.166 1	0.284 8	0.279 4	*Si*	*Si*
mt06	55	55	55.066 7	55.033 3	0.359 0	0.179 5	2.101 2	6.169 1	0.089 8	0.089 8	*No*	*No*
mt10	967	1077	1 022.966 7	1 121.766 7	25.948 0	27.572 6	5.305 2	42.207 7	0.270 4	0.283 4	*Si*	*Si*
mt20	1198	1341	1 261.966 7	1 411.100 0	42.740 7	28.670 9	5.576 7	26.394 8	0.285 3	0.281 5	*Si*	*Si*
orb1	1088	1183	1 164.600 0	1 265.766 7	36.965 4	26.318 2	5.273 1	40.512 3	0.275 8	0.270 7	*Si*	*Si*
orb2	891	957	936.100 0	1 002.400 0	20.098 7	26.730 3	5.306 8	41.082 2	0.274 0	0.276 5	*Si*	*Si*
orb3	1061	1173	1 137.766 7	1 244.500 0	44.450 5	34.390 6	5.188 1	39.885 7	0.287 3	0.284 4	*No*	*Si*
orb4	1012	1117	1 053.800 0	1 150.100 0	24.666 3	19.620 3	5.209 0	41.016 2	0.267 2	0.280 9	*Si*	*Si*
orb5	912	1033	977.400 0	1 080.166 7	38.152 9	23.983 4	5.211 9	41.315 2	0.276 3	0.285 5	*Si*	*Si*

Table 103: P_C =0.6, P_M =0.1, $\#Individuos = 200$

Instancia	$p-value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	$1.436\,0 \cdot 10^{-11}$	u_test
abz9	1.000 0	t_test
la01	$2.614\,2 \cdot 10^{-11}$	u_test
la02	0.187 5	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.187 5	u_test
la29	1.000 0	t_test
mt06	0.502 9	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	$1.505\,9 \cdot 10^{-10}$	u_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 104: P_C =0.6, P_M =0.1, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.26 Caso 26:

Instancia	F_{BEST} GA	F_{BEST} CHC	F_{AVG} GA	F_{AVG} CHC	σ GA	σ CHC	T_{AVG} GA	T_{AVG} CHC	DA GA	DA CHC	Normal GA	Normal CHC
abz5	1242	1357	1 285.833 3	1 405.300 0	22.936 3	24.257 2	5.564 8	41.136 4	0.281 5	0.286 1	*Si*	*Si*
abz6	943	984	971.233 3	1 020.333 3	20.039 4	16.563 7	5.672 4	40.583 7	0.274 4	0.285 1	*Si*	*Si*
abz7	719	888	763.833 3	930.666 7	20.618 9	17.980 2	16.883 4	523.973 3	0.277 6	0.281 0	*Si*	*Si*
abz8	739	912	783.866 7	947.766 7	22.378 2	19.578 4	16.889 8	538.537 1	0.281 3	0.280 3	*Si*	*Si*
abz9	761	913	807.500 0	949.566 7	21.419 2	17.642 2	16.828 2	498.601 1	0.283 7	0.286 3	*Si*	*Si*
la01	666	688	669.500 0	694.133 3	7.570 8	3.403 3	2.914 4	10.390 3	0.192 5	0.201 1	*No*	*No*
la02	655	655	666.733 3	673.566 7	11.395 7	12.553 0	2.916 7	9.540 2	0.262 9	0.243 5	*No*	*No*
la03	603	617	619.133 3	643.100 0	11.760 8	11.866 9	2.918 1	11.011 2	0.276 3	0.266 6	*Si*	*Si*
la04	593	613	603.066 7	637.833 3	6.747 5	17.905 5	2.920 6	9.760 0	0.279 6	0.278 6	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.932 6	10.690 6	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.466 7	0.000 0	1.857 1	4.196 8	18.700 5	NaN	0.118 5	*Si*	*No*
la29	1250	1430	1 320.633 3	1 515.666 7	35.314 3	37.481 0	10.896 8	157.938 8	0.282 7	0.284 6	*Si*	*Si*
mt06	55	55	55.000 0	55.033 3	0.000 0	0.179 5	2.202 4	6.536 7	NaN	0.089 8	*Si*	*No*
mt10	997	1069	1 032.266 7	1 117.433 3	18.978 8	21.116 6	5.520 3	44.895 5	0.284 0	0.281 8	*Si*	*Si*
mt20	1205	1335	1 262.833 3	1 399.033 3	31.573 3	29.300 2	5.458 4	28.741 0	0.272 4	0.271 9	*Si*	*Si*
orb1	1113	1203	1 167.766 7	1 265.066 7	24.825 6	28.677 4	5.545 3	42.552 6	0.282 2	0.283 0	*Si*	*Si*
orb2	903	947	944.866 7	1 003.200 0	24.369 0	26.010 8	5.557 6	43.313 2	0.267 9	0.282 7	*Si*	*Si*
orb3	1058	1165	1 121.300 0	1 227.833 3	30.371 2	25.543 5	5.549 2	42.521 5	0.282 3	0.266 3	*Si*	*Si*
orb4	1012	1097	1 063.600 0	1 142.666 7	27.029 1	18.192 2	5.574 4	42.833 8	0.270 2	0.277 5	*Si*	*Si*
orb5	934	1030	989.633 3	1 075.533 3	32.895 3	22.454 0	5.573 3	40.051 7	0.283 0	0.279 3	*Si*	*Si*

Table 105: P_C =0.7, P_M =0.1, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	1.000 0	t_test
abz6	1.000 0	t_test
abz7	1.000 0	t_test
abz8	1.000 0	t_test
abz9	1.000 0	t_test
la01	$3.880\,9 \cdot 10^{-11}$	u_test
la02	0.014 1	u_test
la03	1.000 0	t_test
la04	1.000 0	t_test
la05	NaN	$t\_test(*)$
la06	0.252 9	u_test
la29	1.000 0	t_test
mt06	0.412 2	u_test
mt10	1.000 0	t_test
mt20	1.000 0	t_test
orb1	1.000 0	t_test
orb2	1.000 0	t_test
orb3	1.000 0	t_test
orb4	1.000 0	t_test
orb5	1.000 0	t_test

Table 106: P_C =0.7, P_M =0.1, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

4.27 Caso 27:

	F_{BEST}		F_{AVG}		σ		T_{AVG}		DA		Normal	
Instancia	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC	GA	CHC
abz5	1249	1353	1 283.700 0	1 412.533 3	20.776 8	23.096 5	5.873 3	43.187 2	0.286 6	0.278 4	*No*	*Si*
abz6	945	965	973.800 0	1 015.266 7	17.799 6	24.679 2	5.507 7	41.688 9	0.277 8	0.277 7	*Si*	*Si*
abz7	740	881	769.366 7	925.133 3	18.513 9	15.059 3	16.850 5	522.295 9	0.286 7	0.272 8	*No*	*Si*
abz8	746	915	776.700 0	946.000 0	14.724 5	21.068 1	17.451 8	522.351 3	0.267 2	0.283 2	*Si*	*Si*
abz9	787	898	814.566 7	957.466 7	14.952 6	18.707 8	17.125 8	507.136 8	0.272 2	0.271 2	*Si*	*Si*
la01	666	688	670.000 0	696.333 3	8.445 9	8.332 0	2.871 1	8.808 3	0.194 7	0.174 2	*No*	*No*
la02	655	657	667.000 0	673.333 3	8.725 4	16.034 0	2.897 8	8.502 8	0.279 6	0.217 2	*Si*	*No*
la03	597	630	619.600 0	645.266 7	11.614 9	11.667 4	2.882 9	8.655 7	0.281 1	0.272 8	*Si*	*Si*
la04	590	611	606.366 7	636.066 7	8.420 1	17.650 2	2.876 8	8.563 8	0.266 6	0.274 2	*Si*	*Si*
la05	593	593	593.000 0	593.000 0	0.000 0	0.000 0	2.879 4	9.549 3	NaN	NaN	*Si*	*Si*
la06	926	926	926.000 0	926.333 3	0.000 0	1.795 1	4.155 2	17.203 5	NaN	0.089 8	*Si*	*No*
la29	1261	1469	1 326.833 3	1 521.633 3	34.414 2	31.610 6	10.807 8	148.279 0	0.277 2	0.284 4	*Si*	*Si*
mt06	55	55	55.100 0	55.033 3	0.538 5	0.179 5	2.156 9	5.912 0	0.089 8	0.089 8	*No*	*No*
mt10	1002	1077	1 029.600 0	1 116.066 7	17.566 3	21.176 9	5.472 5	40.161 6	0.271 5	0.281 0	*Si*	*Si*
mt20	1188	1364	1 259.133 3	1 410.133 3	28.760 8	26.724 2	5.391 4	26.265 1	0.270 3	0.281 6	*Si*	*Si*
orb1	1104	1189	1 162.866 7	1 263.000 0	27.361 4	29.607 4	5.482 5	40.591 3	0.278 4	0.278 3	*Si*	*Si*
orb2	898	933	939.433 3	993.200 0	22.127 9	25.718 2	5.516 2	40.646 2	0.281 6	0.279 2	*Si*	*Si*
orb3	1079	1204	1 146.166 7	1 246.466 7	33.224 6	28.238 0	5.467 2	41.279 8	0.278 4	0.281 6	*Si*	*Si*
orb4	1017	1100	1 056.500 0	1 148.166 7	20.276 0	16.484 5	5.496 6	40.194 7	0.281 3	0.275 5	*Si*	*Si*
orb5	919	1035	963.233 3	1 077.066 7	27.165 8	26.135 5	5.503 8	40.209 9	0.285 9	0.278 7	*Si*	*Si*

Table 107: P_C =0.8, P_M =0.1, $\#Individuos = 200$

Instancia	$p - value$	Test
abz5	$1.436\,0 \cdot 10^{-11}$	u_test
abz6	$1.000\,0$	t_test
abz7	$1.436\,0 \cdot 10^{-11}$	u_test
abz8	$1.000\,0$	t_test
abz9	$1.000\,0$	t_test
la01	$3.880\,9 \cdot 10^{-11}$	u_test
la02	$0.277\,1$	u_test
la03	$1.000\,0$	t_test
la04	$1.000\,0$	t_test
la05	NaN	$t\_test(*)$
la06	$0.412\,2$	u_test
la29	$1.000\,0$	t_test
mt06	$0.502\,9$	u_test
mt10	$1.000\,0$	t_test
mt20	$1.000\,0$	t_test
orb1	$1.000\,0$	t_test
orb2	$1.000\,0$	t_test
orb3	$1.000\,0$	t_test
orb4	$1.000\,0$	t_test
orb5	$1.000\,0$	t_test

Table 108: P_C =0.8, P_M =0.1, $\#Individuos = 200$ $(*)\sigma_{X_1X_2} = 0$

5 Todos los casos:

Instancia				GA		CHC	
	P_C	P_M	$\#ind$	F_{AVG}	T_{AVG}	F_{AVG}	T_{AVG}
1	0.6	0.01	50	878.041 7	5.759 5	1 006.585 0	26.709 7
2	0.6	0.01	100	877.875 0	6.260 1	1 006.203 3	27.289 1
3	0.6	0.01	200	878.665 0	6.595 5	1 004.673 3	26.806 5
4	0.7	0.01	50	879.296 7	6.228 6	982.228 3	53.579 8
5	0.8	0.01	50	878.055 0	6.577 6	983.048 3	54.420 2
6	0.6	0.05	50	879.325 0	6.550 1	984.106 7	52.375 3
7	0.7	0.05	50	879.971 7	6.682 8	982.228 3	53.579 8
8	0.8	0.05	50	880.578 3	6.520 1	983.048 3	54.420 2
9	0.6	0.1	50	879.196 7	5.925 3	984.106 7	52.375 3
10	0.7	0.1	50	880.880 0	6.178 7	982.228 3	53.579 8
11	0.8	0.1	50	879.028 3	7.103 0	983.048 3	54.420 2
12	0.7	0.01	100	880.621 7	5.874 7	984.106 7	52.375 3
13	0.8	0.01	100	882.515 0	6.366 1	961.160 0	108.115 5
14	0.6	0.05	100	882.835 0	6.867 3	962.875 0	106.074 2
15	0.7	0.05	100	882.850 0	6.630 4	962.870 0	103.774 4
16	0.8	0.05	100	882.731 7	6.823 3	961.160 0	108.115 5
17	0.6	0.1	100	881.696 7	7.360 4	962.875 0	106.074 2
18	0.7	0.1	100	882.361 7	6.379 6	962.870 0	103.774 4
19	0.8	0.1	100	882.380 0	6.625 8	961.160 0	108.115 5
20	0.7	0.01	200	881.948 3	6.633 3	962.875 0	106.074 2
21	0.8	0.01	200	880.663 3	5.971 5	962.870 0	103.774 4
22	0.6	0.05	200	879.156 7	6.234 9	1 006.203 3	27.289 1
23	0.7	0.05	200	877.128 3	6.512 5	1 004.673 3	26.806 5
24	0.8	0.05	200	877.841 7	5.921 5	1 006.585 0	26.709 7
25	0.6	0.1	200	879.243 3	6.110 9	1 006.203 3	27.289 1
26	0.7	0.1	200	879.206 7	6.687 2	1 004.673 3	26.806 5
27	0.8	0.1	200	879.000 0	5.899 8	1 006.585 0	26.709 7

6 GA 5k Generaciones:

Instancia	F_{OPT}	F_{BEST}	F_{AVG}
abz5	1234	1238	1 275.366 7
abz7	656	710	743.300 0
abz8	665	724	750.466 7
abz9	679	758	781.866 7
la29	1153	1229	1 291.533 3
mt10	930	956	1 015.966 7
mt20	1165	1182	1 239.033 3
orb1	1059	1097	1 141.100 0
orb2	888	889	923.000 0
orb3	1005	1040	1 115.800 0
orb4	1005	1020	1 047.300 0
orb5	887	909	955.600 0

Table 109: $P_C = 0.7, P_M = 0.05, \#Individuos = 200, \#gen = 5000$

7 Gráficas

7.1 GA

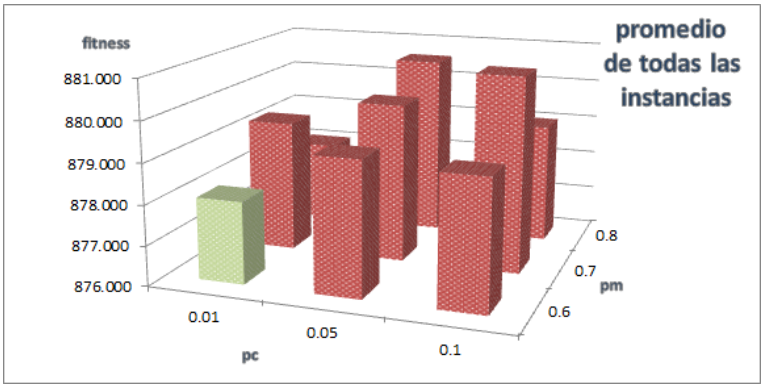

Figure 1: Promedio para 50 individuos

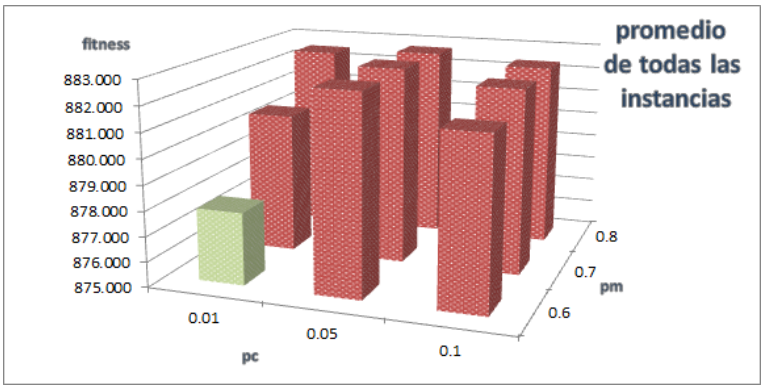

Figure 2: Promedio para 100 individuos

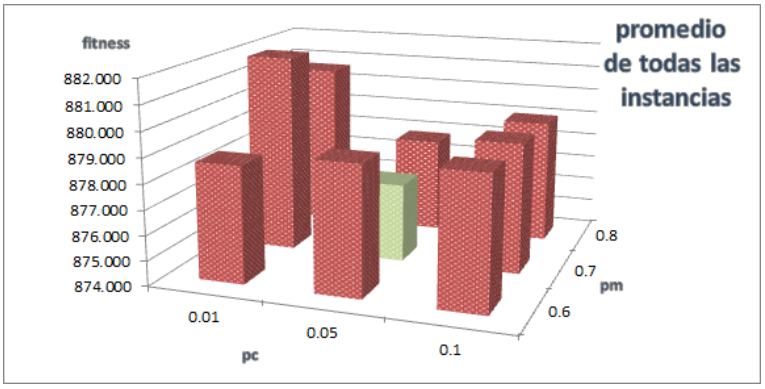

Figure 3: Promedio para 200 individuos

7.2 CHC

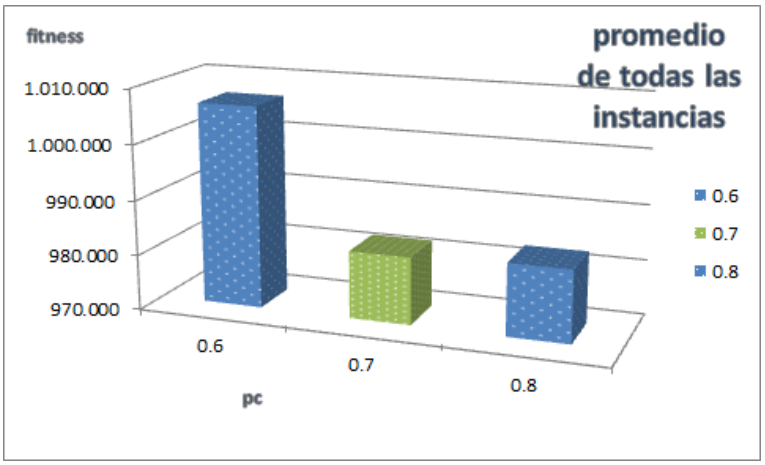

Figure 4: Promedio para 50 individuos

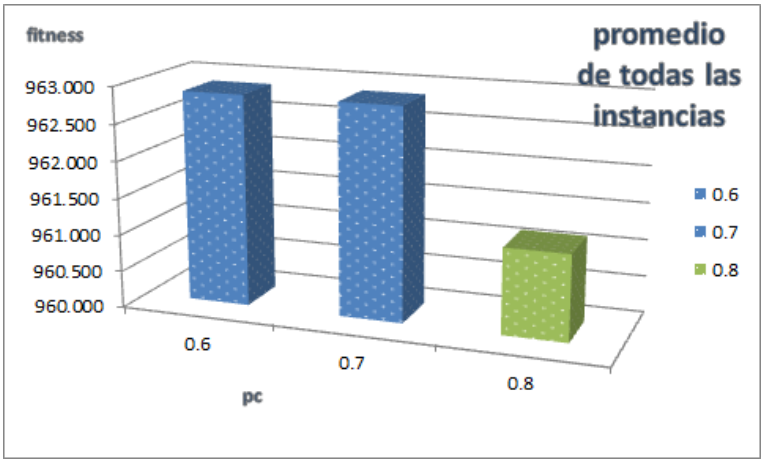

Figure 5: Promedio para 100 individuos

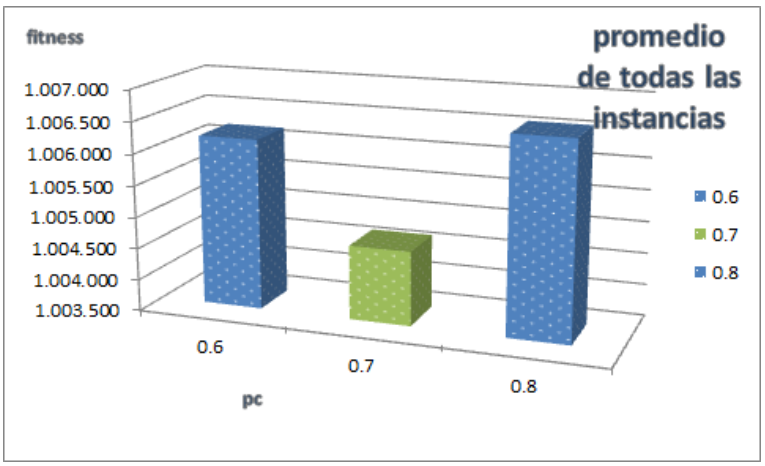

Figure 6: Promedio para 200 individuos

7.3 CHC-GA

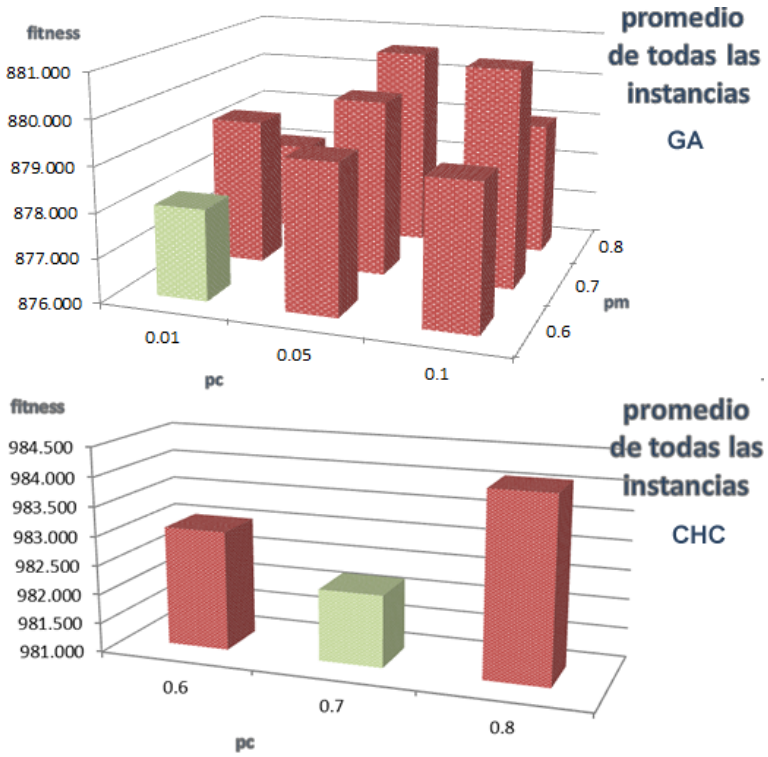

Figure 7: Promedio para 50 individuos

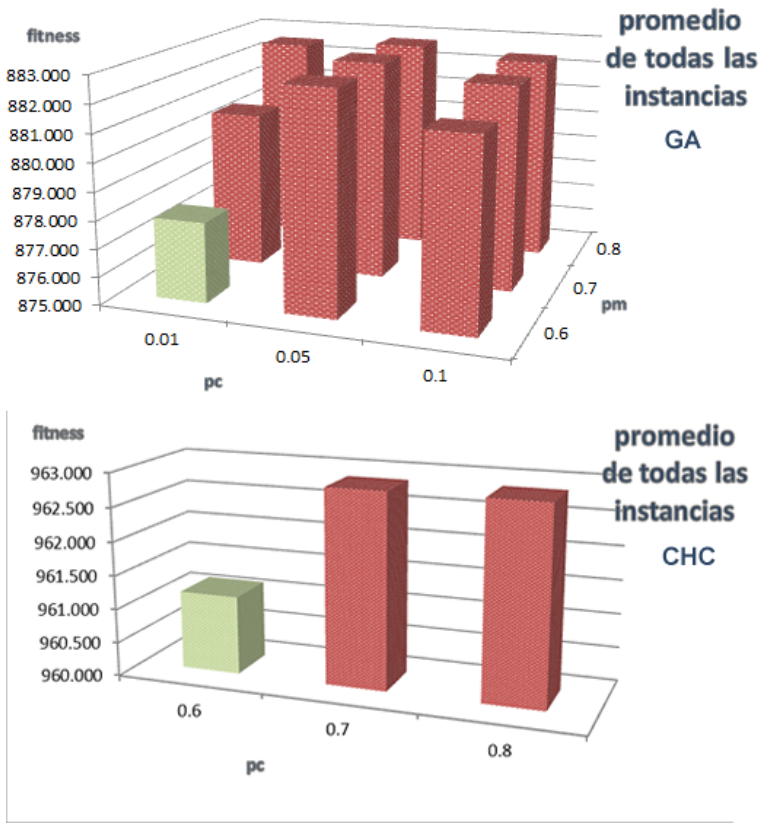

Figure 8: Promedio para 100 individuos

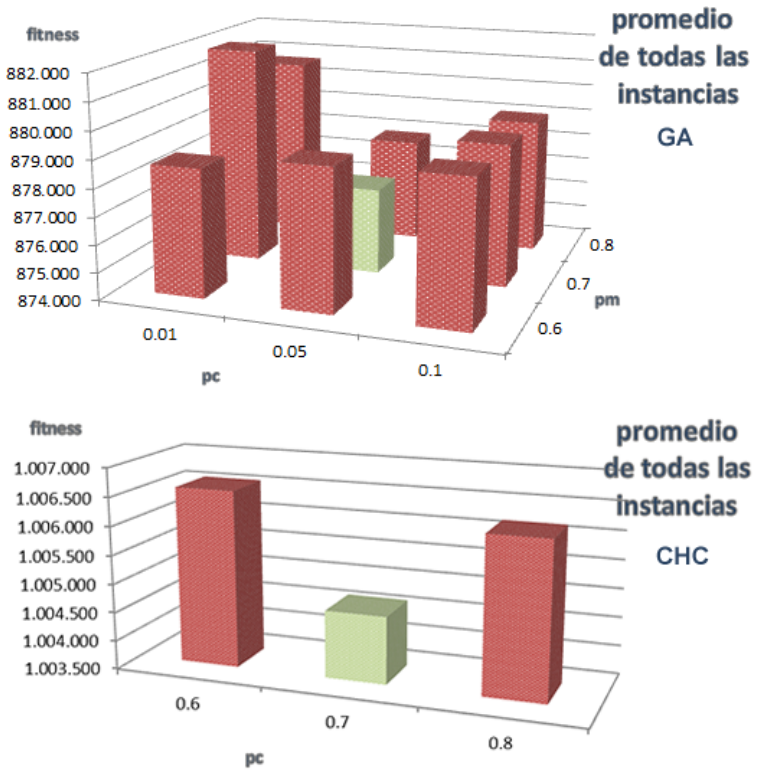

Figure 9: Promedio para 200 individuos