1. Parámetros

Cuadro 1: Parámetros de NSGA2, NSGA3, MOEAD

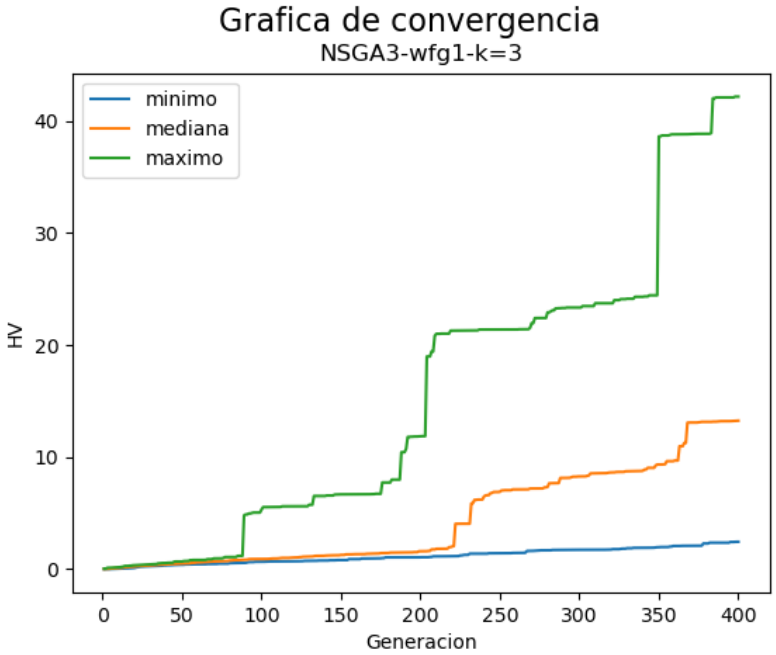
Número de objetivos	Divisiones		Tamaño de población	Número de generaciones
	H_1	H_2		
3	12	-	92	400
5	6	-	212	750
6	4	-	195	1000
7	3	-	175	1250
8	3	2	156	1500
9	3	2	215	1750
10	3	2	275	2000

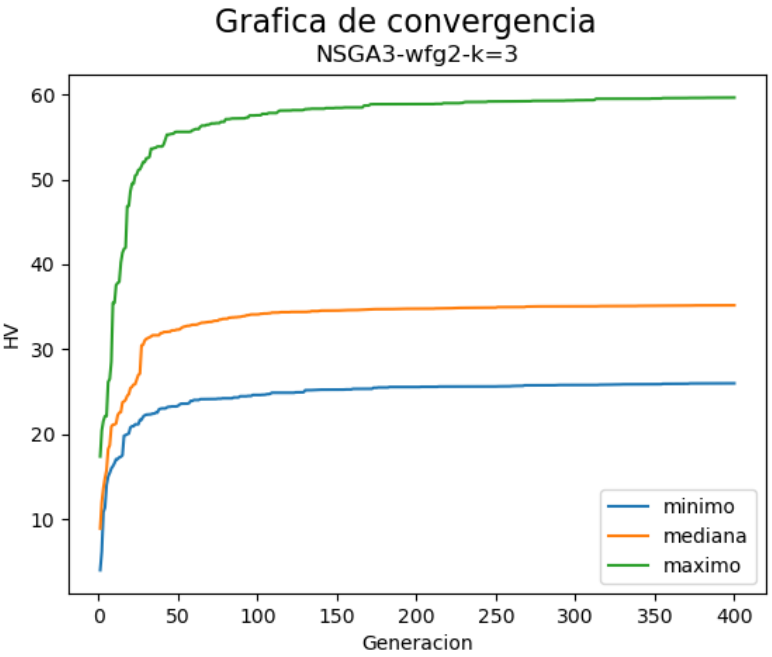
Para estos tres algoritmos se utilizaron $p_c = 1$ y $p_m = \frac{1}{24}$.

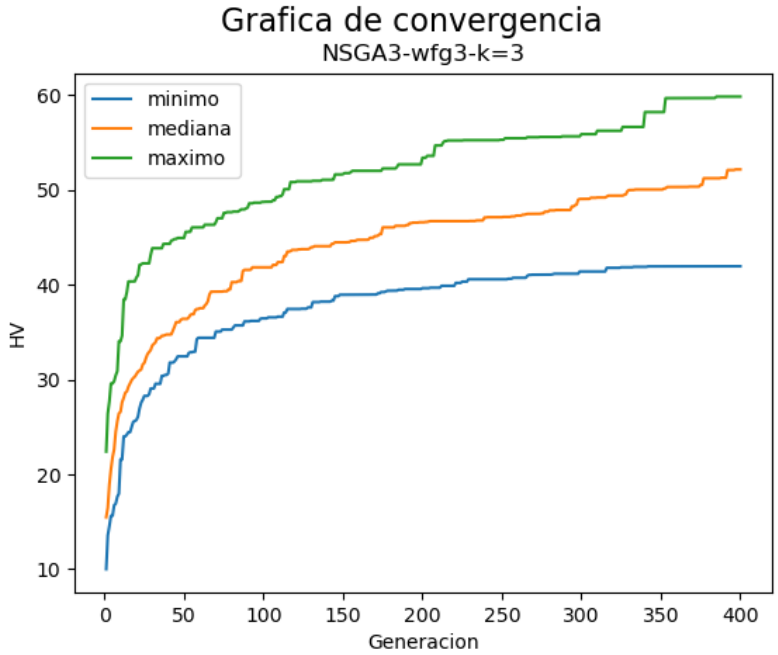
Cuadro 2: Parámetros de SMS-EMOA

Número de objetivos	Tamaño de población	Número de generaciones
3	92	400
5	10	750
6	8	1000
7	6	1250
8	5	1500
9	4	1750
10	4	2000

2. Gráficas de convergencia


Grafica de convergencia
NSGA3-wfg1-k=3
minimo
mediana
maximo
HV
Generacion
0
10
20
30
40
0
50
100
150
200
250
300
350
400


Grafica de convergencia
NSGA3-wfg2-k=3
minimo
mediana
maximo
HV
Generacion
10
20
30
40
50
60
0
50
100
150
200
250
300
350
400


Grafica de convergencia
NSGA3-wfg3-k=3
minimo
mediana
maximo
HV
Generacion
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30
40
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60
0
50
100
150
200
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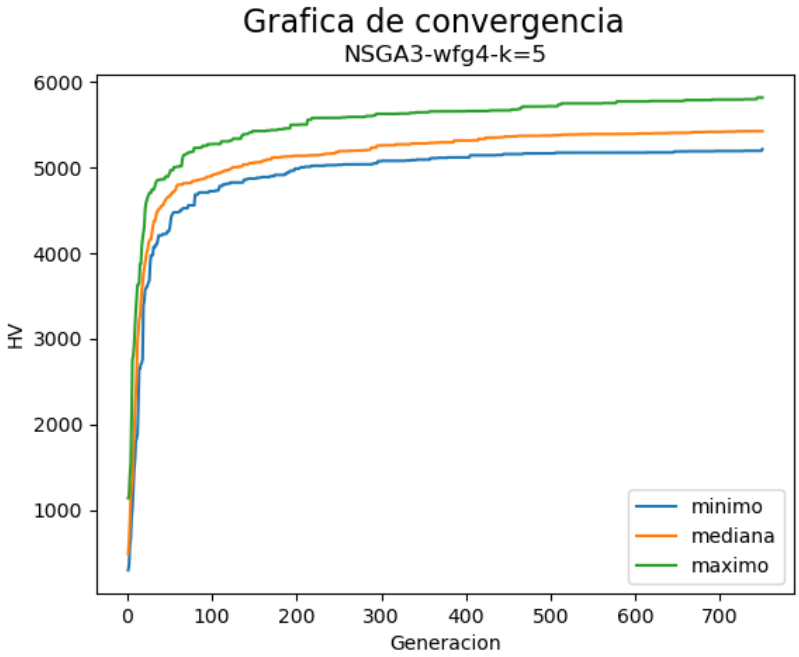
300
350
400


Grafica de convergencia
NSGA3-wfg4-k=5
minimo
mediana
maximo
HV
Generacion
1000
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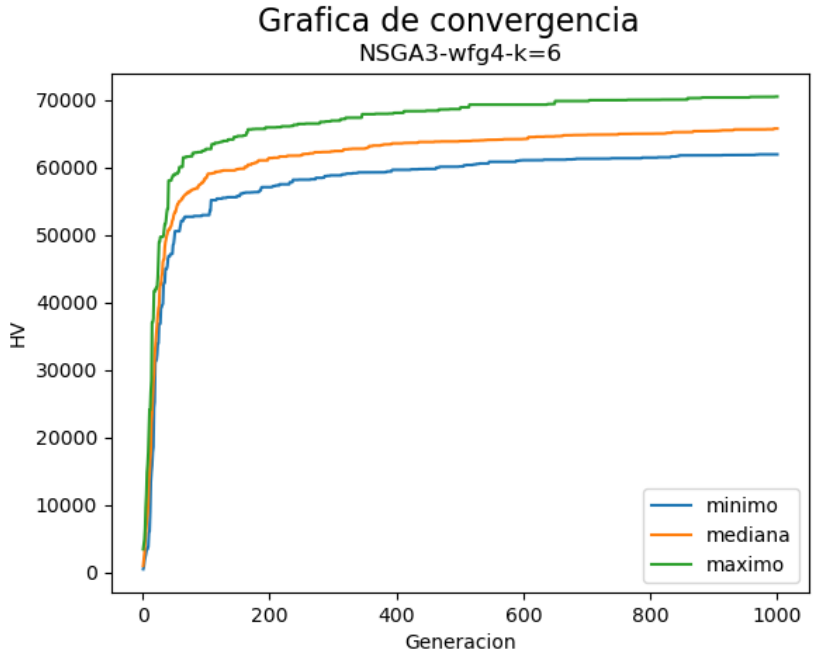
3000
4000
5000
6000
0
100
200
300
400
500
600
700


Grafica de convergencia
NSGA3-wfg4-k=6
HV
Generacion
minimo
mediana
maximo
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10000
20000
30000
40000
50000
60000
70000
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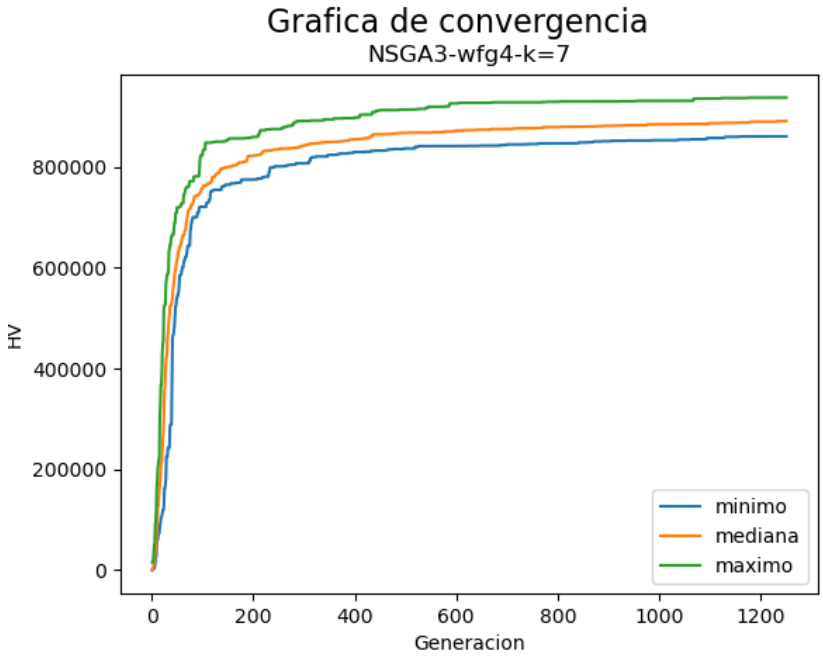
400
600
800
1000


Grafica de convergencia
NSGA3-wfg4-k=7
HV
Generacion
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mediana
maximo
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400000
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800000
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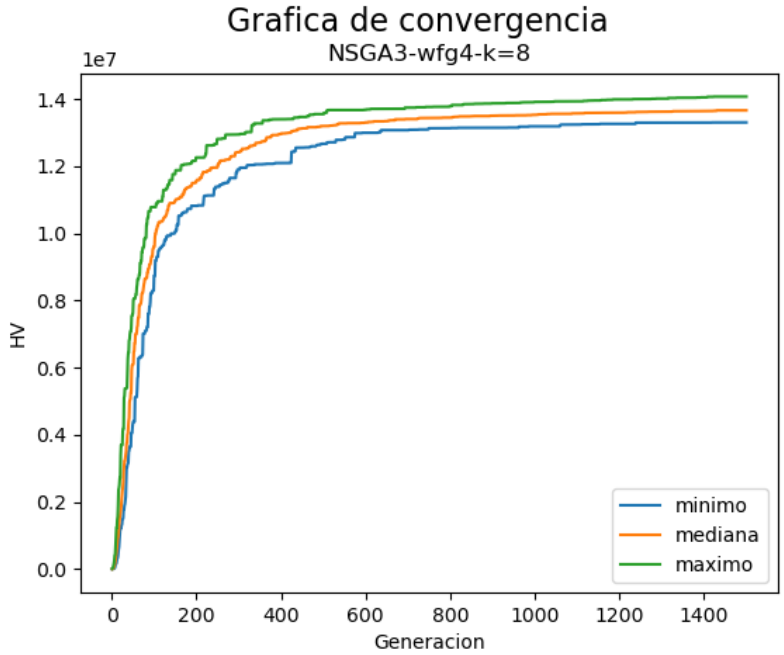
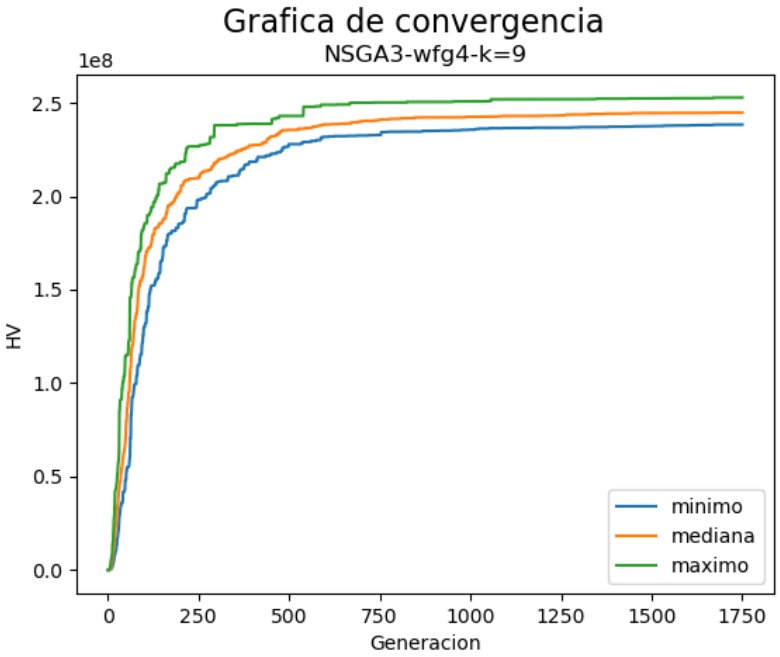
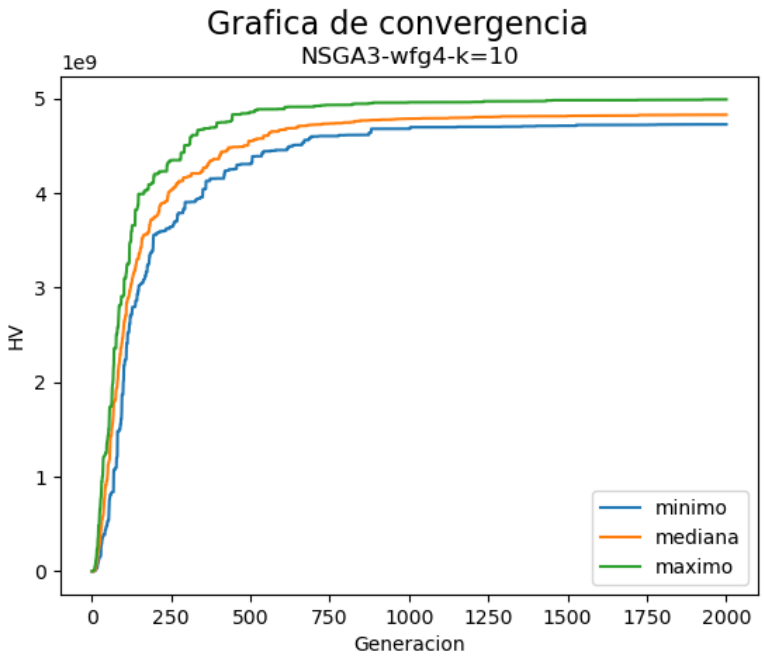
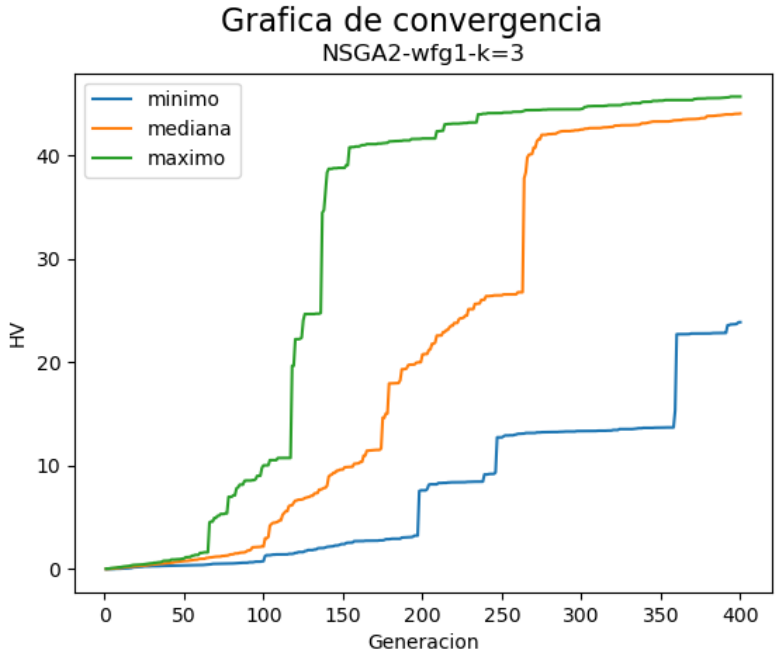
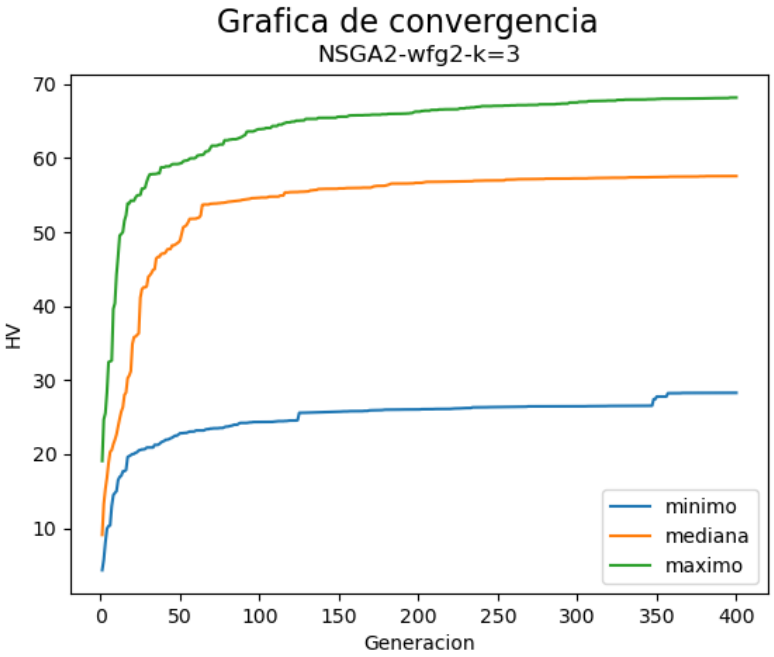
600
800
1000
1200


Grafica de convergencia
NSGA3-wfg4-k=8
1e7
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
HV
0
200
400
600
800
1000
1200
1400
Generacion
minimo
mediana
maximo


Grafica de convergencia
NSGA3-wfg4-k=9
1e8
2.5
2.0
1.5
1.0
0.5
0.0
HV
0
250
500
750
1000
1250
1500
1750
Generacion
minimo
mediana
maximo


Grafica de convergencia
NSGA3-wfg4-k=10
1e9
5
4
3
2
1
0
HV
0
250
500
750
1000
1250
1500
1750
2000
Generacion
minimo
mediana
maximo


Grafica de convergencia
NSGA2-wfg1-k=3
minimo
mediana
maximo
HV
Generacion
0
10
20
30
40
0
50
100
150
200
250
300
350
400


Grafica de convergencia
NSGA2-wfg2-k=3
minimo
mediana
maximo
HV
Generacion
10
20
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100
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200
250
300
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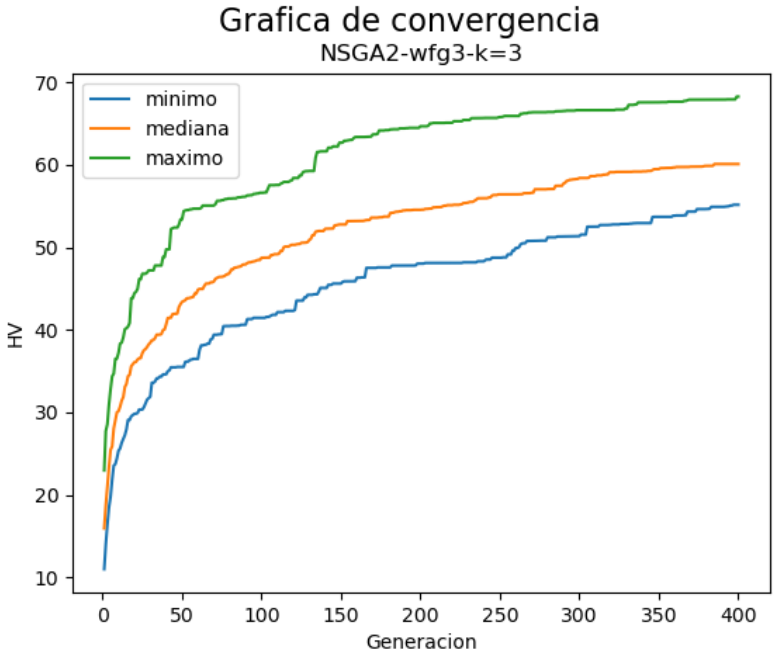
400


Grafica de convergencia
NSGA2-wfg3-k=3
minimo
mediana
maximo
HV
Generacion
70
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30
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0
50
100
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250
300
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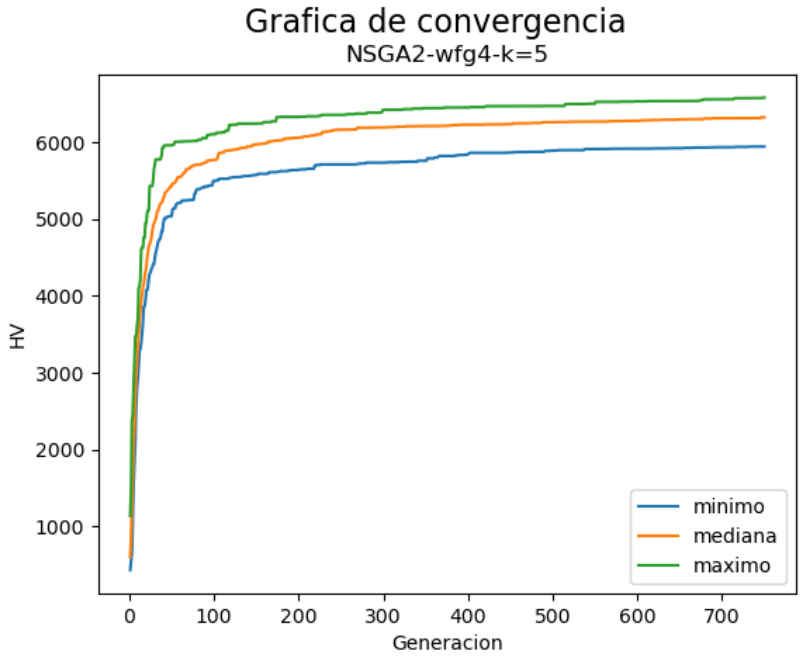
400


Grafica de convergencia
NSGA2-wfg4-k=5
minimo
mediana
maximo
HV
Generacion
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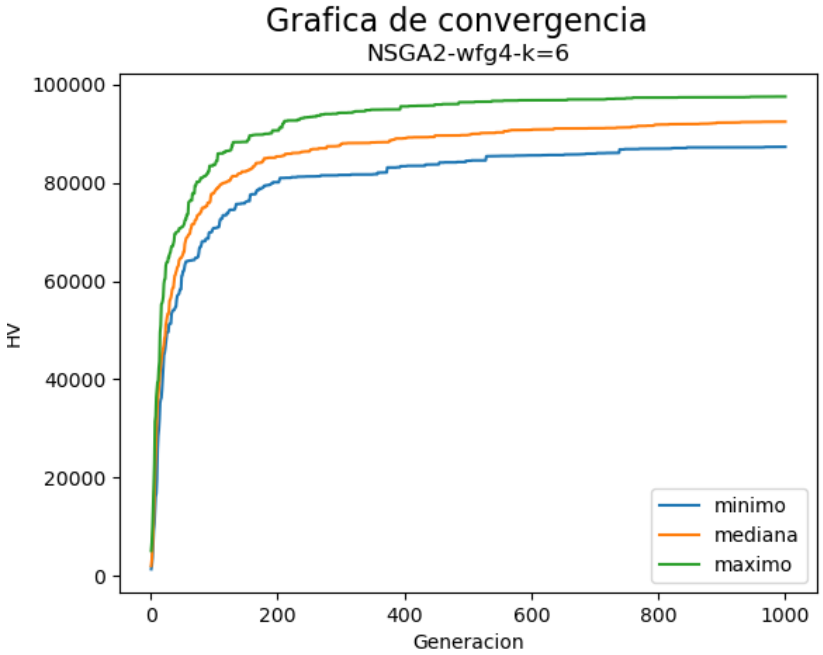
700


Grafica de convergencia
NSGA2-wfg4-k=6
HV
Generacion
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mediana
maximo
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80000
100000
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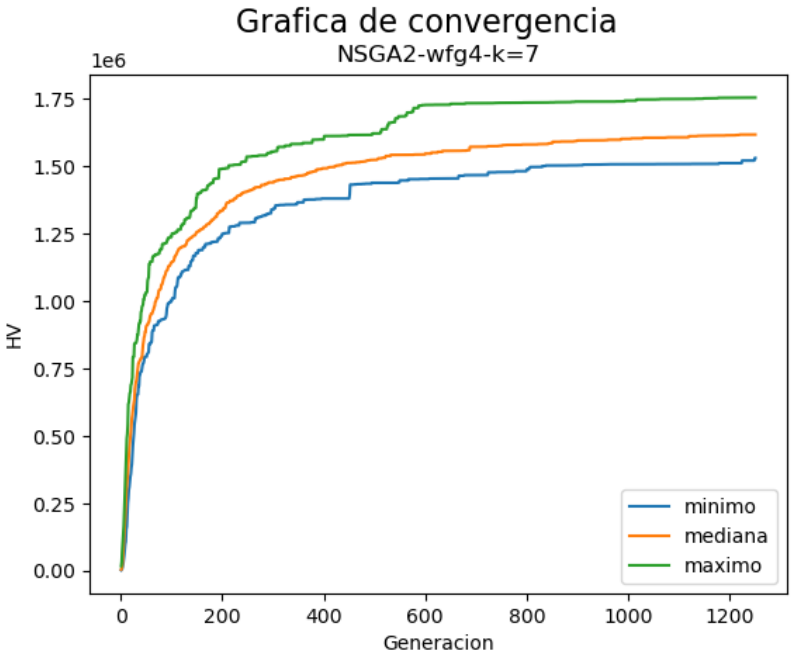
400
600
800
1000


Grafica de convergencia
NSGA2-wfg4-k=7
1e6
HV
Generacion
minimo
mediana
maximo
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1.00
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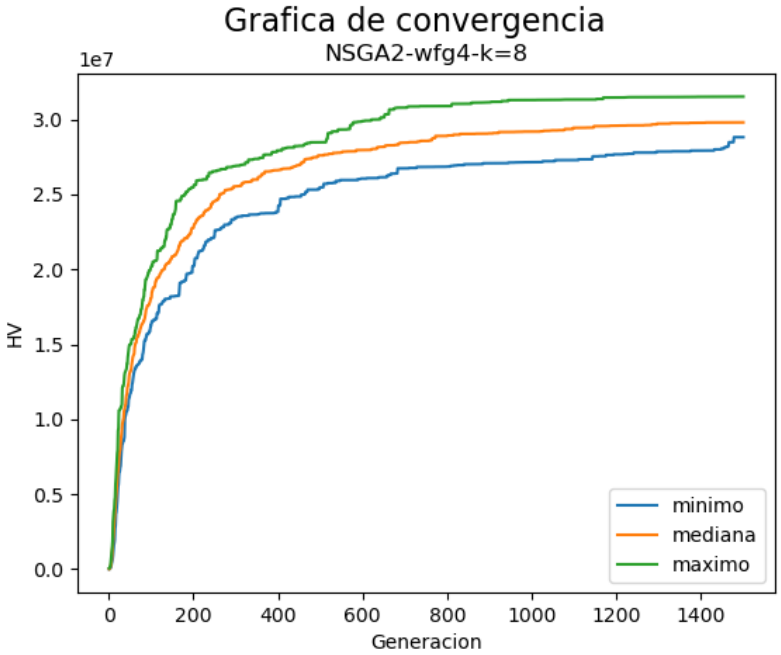
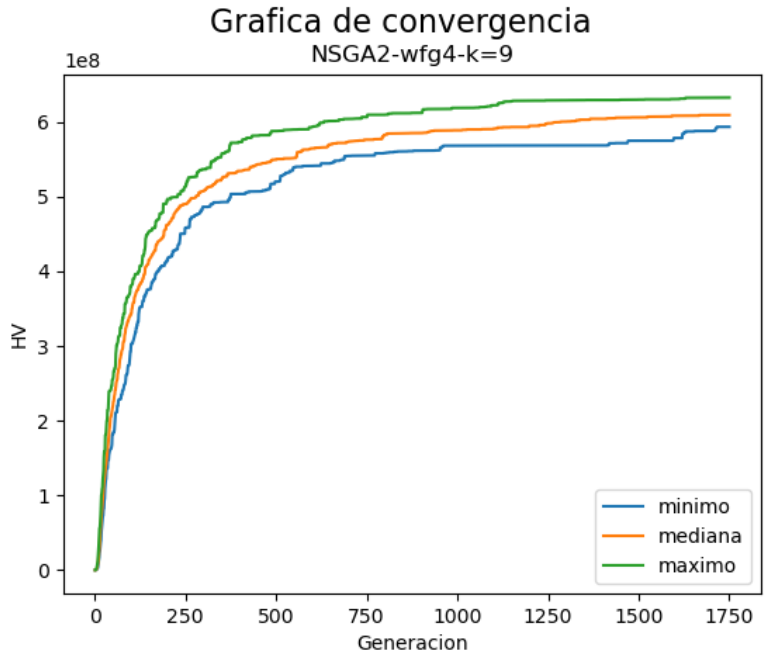
1.50
1.75
0
200
400
600
800
1000
1200


Grafica de convergencia
NSGA2-wfg4-k=8
1e7
3.0
2.5
2.0
1.5
1.0
0.5
0.0
HV
0
200
400
600
800
1000
1200
1400
Generacion
minimo
mediana
maximo


Grafica de convergencia
NSGA2-wfg4-k=9
1e8
6
5
4
3
2
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0
HV
0
250
500
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1000
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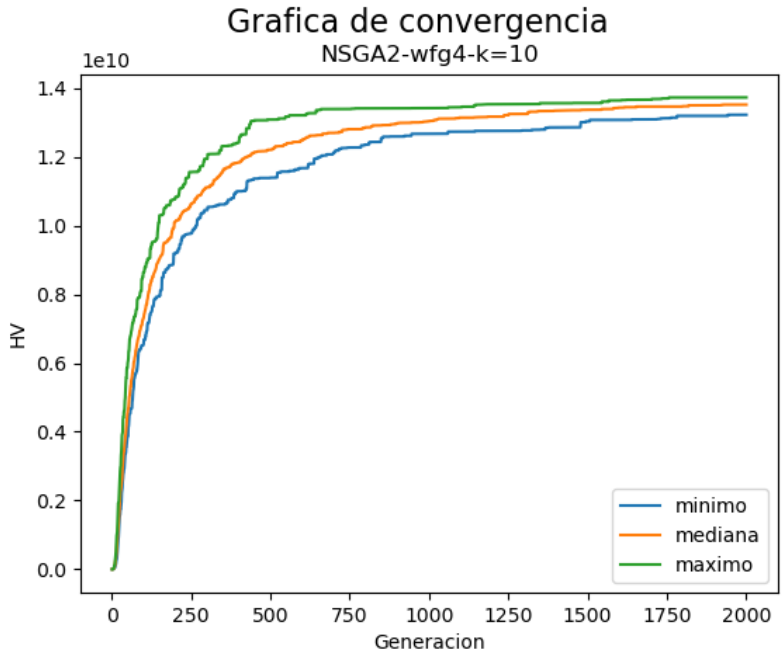
1500
1750
Generacion
minimo
mediana
maximo


Grafica de convergencia
NSGA2-wfg4-k=10
1e10
1.4
1.2
1.0
0.8
0.6
0.4
0.2
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HV
0
250
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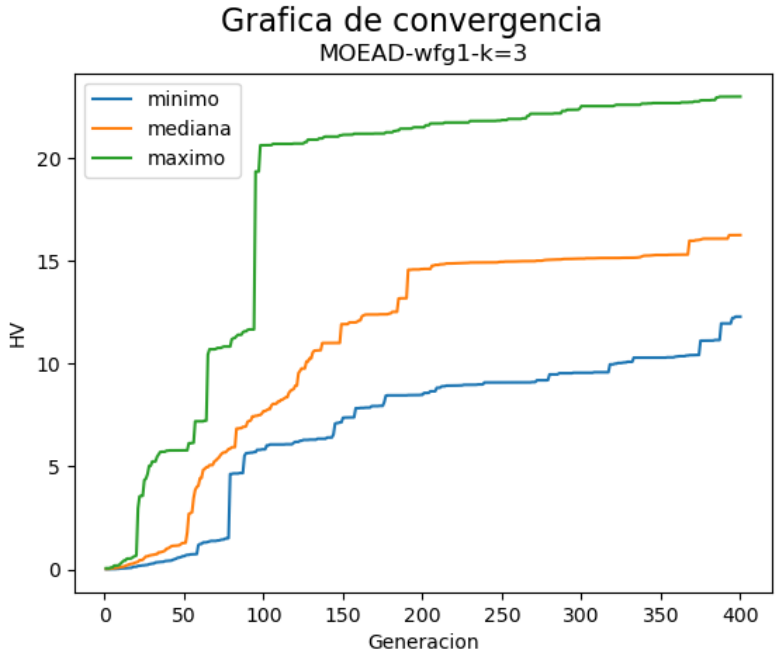
750
1000
1250
1500
1750
2000
Generacion
minimo
mediana
maximo


Grafica de convergencia
MOEAD-wfg1-k=3
minimo
mediana
maximo
HV
Generacion
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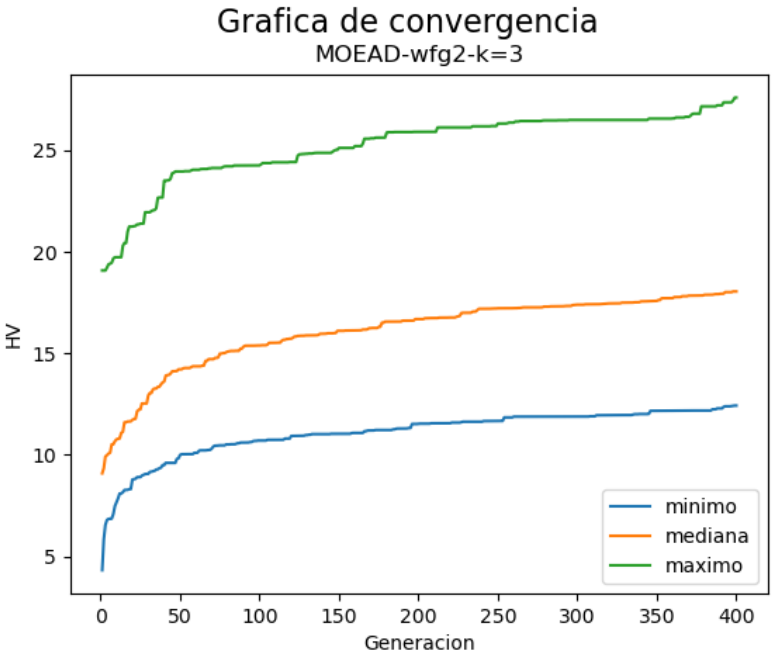
10
15
20
0
50
100
150
200
250
300
350
400


Grafica de convergencia
MOEAD-wfg2-k=3
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mediana
maximo
HV
Generacion
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15
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25
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350
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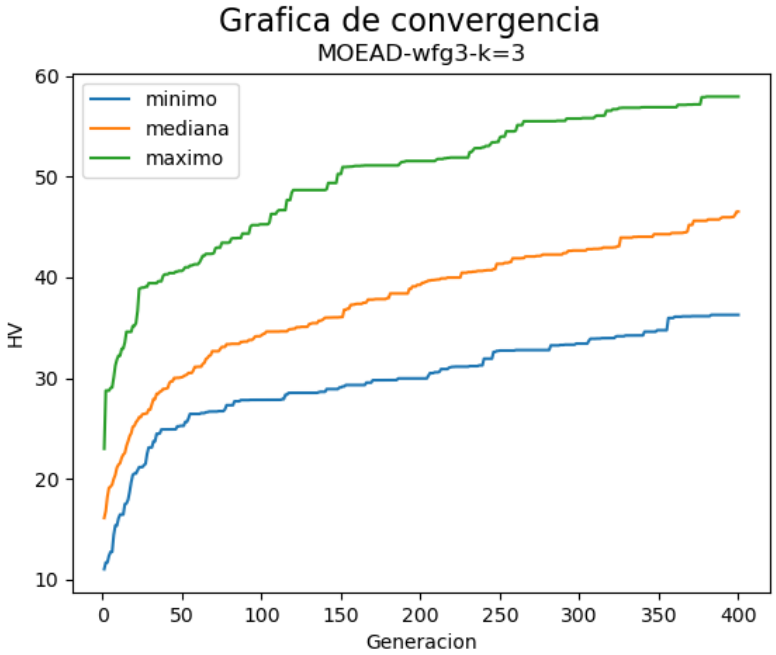
Grafica de convergencia
MOEAD-wfg3-k=3
minimo
mediana
maximo
HV
Generacion
60
50
40
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20
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50
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250
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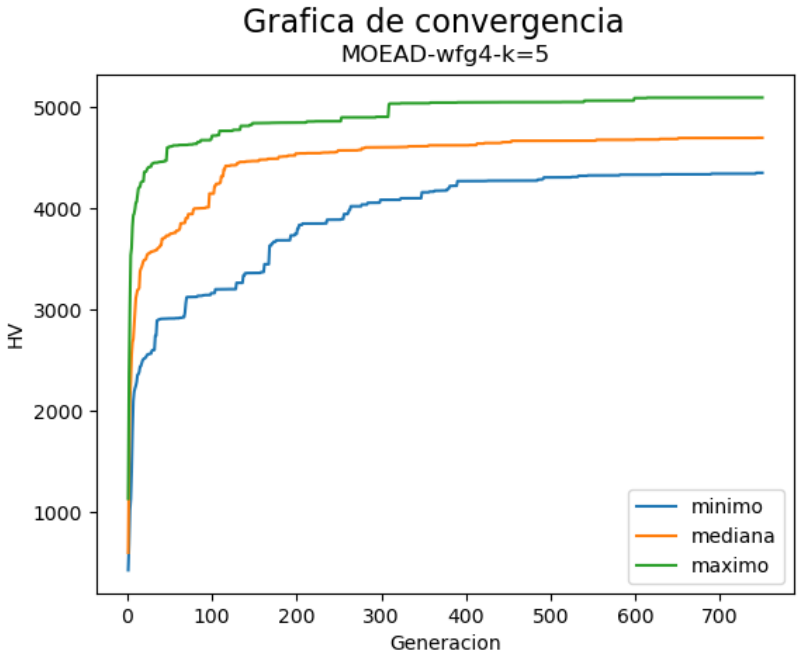
350
400


Grafica de convergencia
MOEAD-wfg4-k=5
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mediana
maximo
HV
Generacion
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4000
3000
2000
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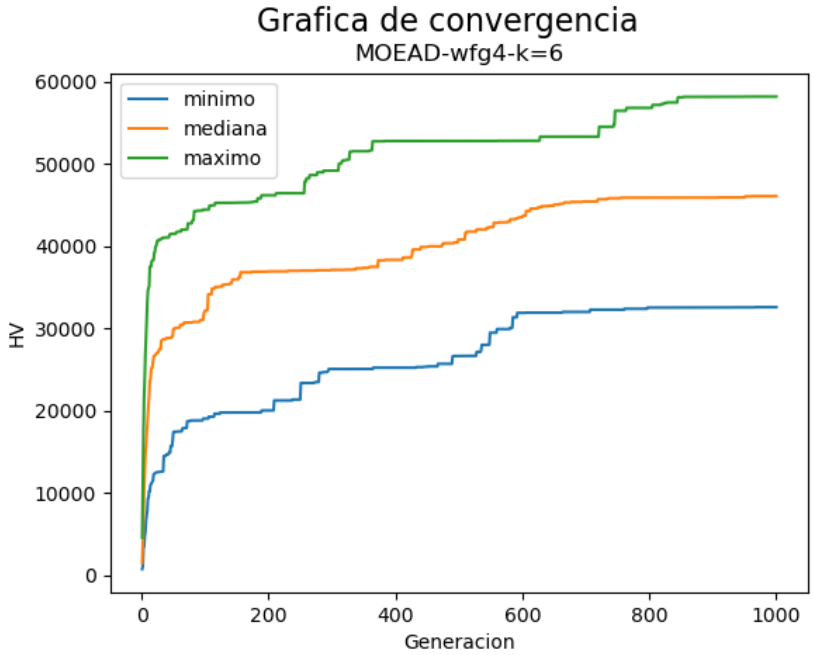
400
500
600
700


Grafica de convergencia
MOEAD-wfg4-k=6
minimo
mediana
maximo
HV
Generacion
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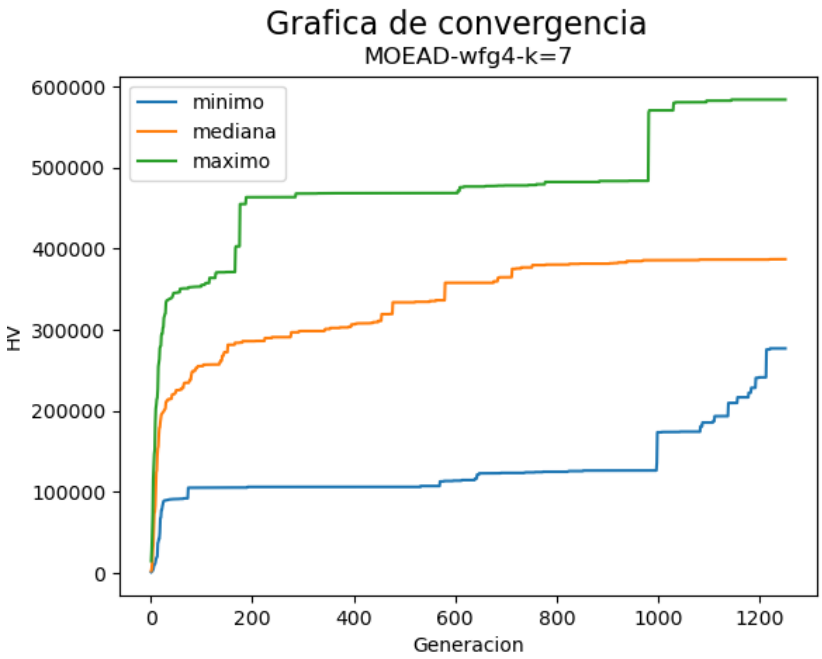
Grafica de convergencia
MOEAD-wfg4-k=7
minimo
mediana
maximo
HV
Generacion
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300000
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600000
0
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600
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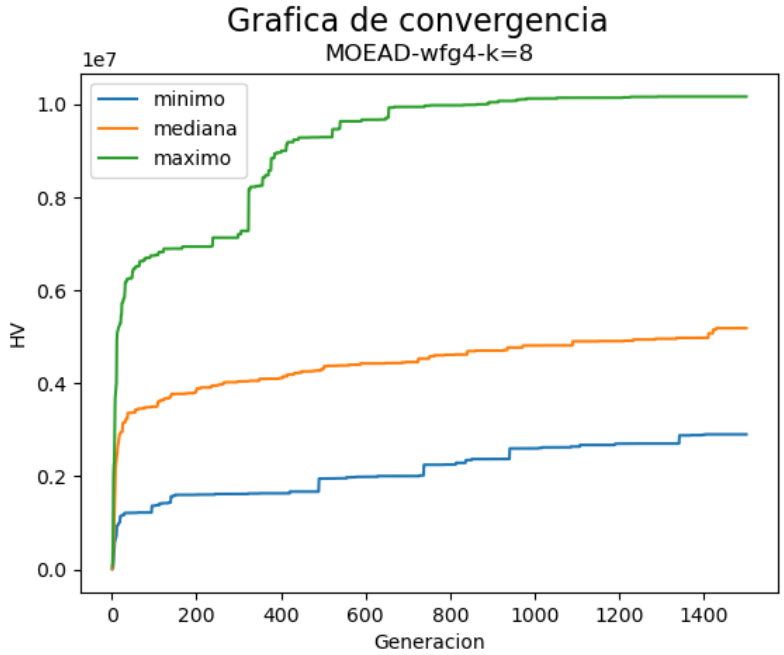
1000
1200


Grafica de convergencia
MOEAD-wfg4-k=8
1e7
minimo
mediana
maximo
HV
Generacion
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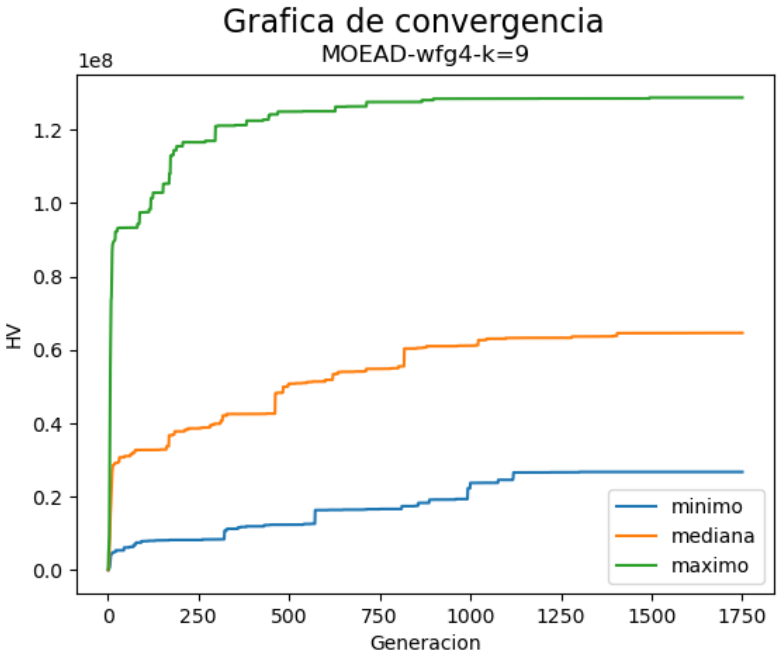
0.2
0.4
0.6
0.8
1.0
0
200
400
600
800
1000
1200
1400


Grafica de convergencia
MOEAD-wfg4-k=9
1e8
minimo
mediana
maximo
HV
Generacion
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0.2
0.4
0.6
0.8
1.0
1.2
0
250
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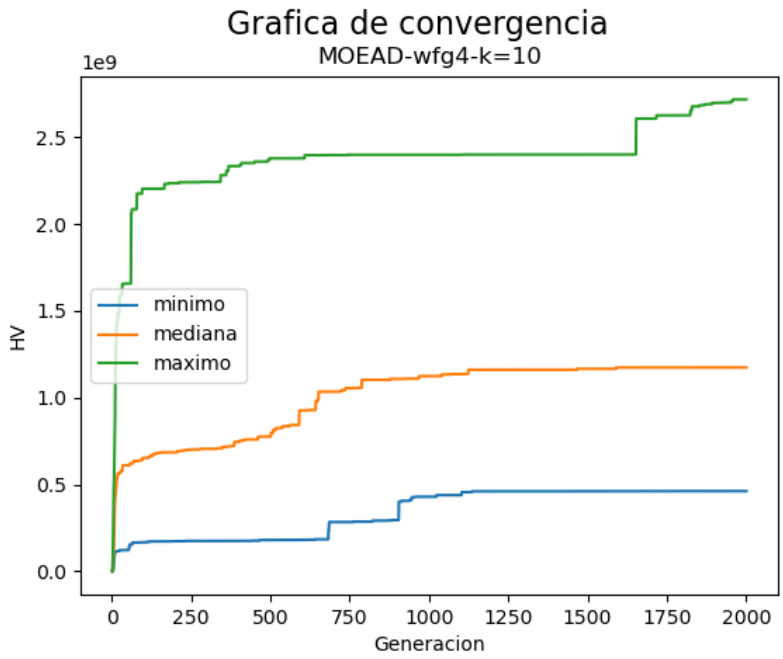
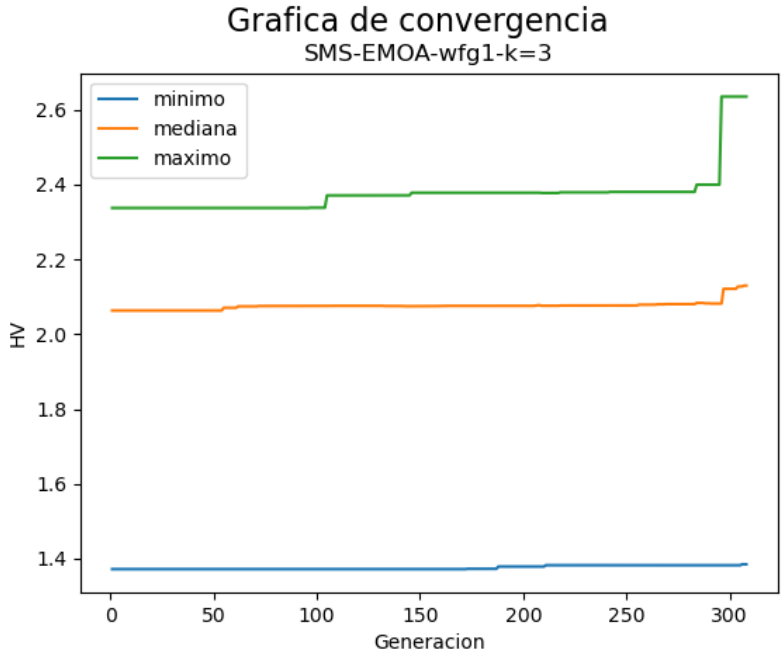
750
1000
1250
1500
1750


Grafica de convergencia
MOEAD-wfg4-k=10
1e9
2.5
2.0
1.5
1.0
0.5
0.0
HV
minimo
mediana
maximo
0
250
500
750
1000
1250
1500
1750
2000
Generacion


Grafica de convergencia
SMS-EMOA-wfg1-k=3
minimo
mediana
maximo
HV
Generacion
2.6
2.4
2.2
2.0
1.8
1.6
1.4
0
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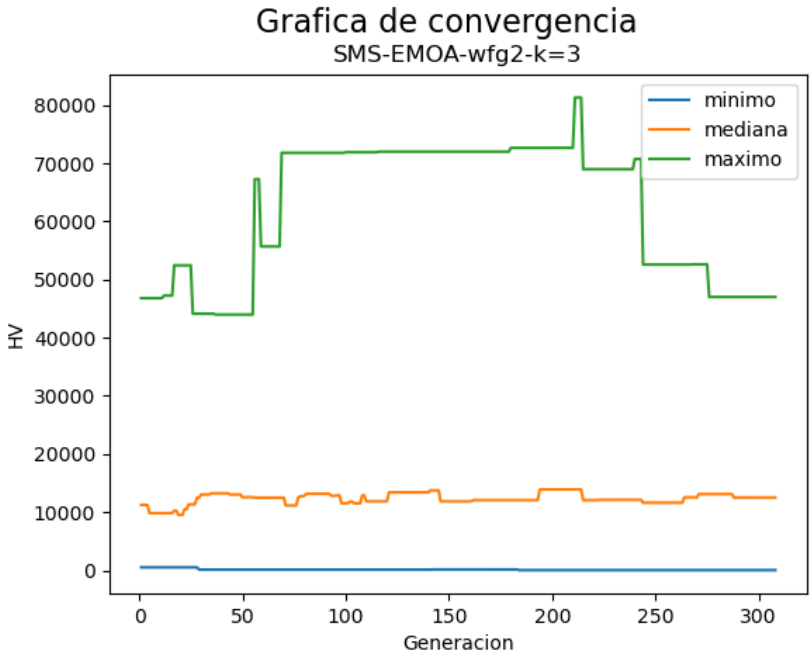
100
150
200
250
300


Grafica de convergencia
SMS-EMOA-wfg2-k=3
minimo
mediana
maximo
HV
Generacion
80000
70000
60000
50000
40000
30000
20000
10000
0
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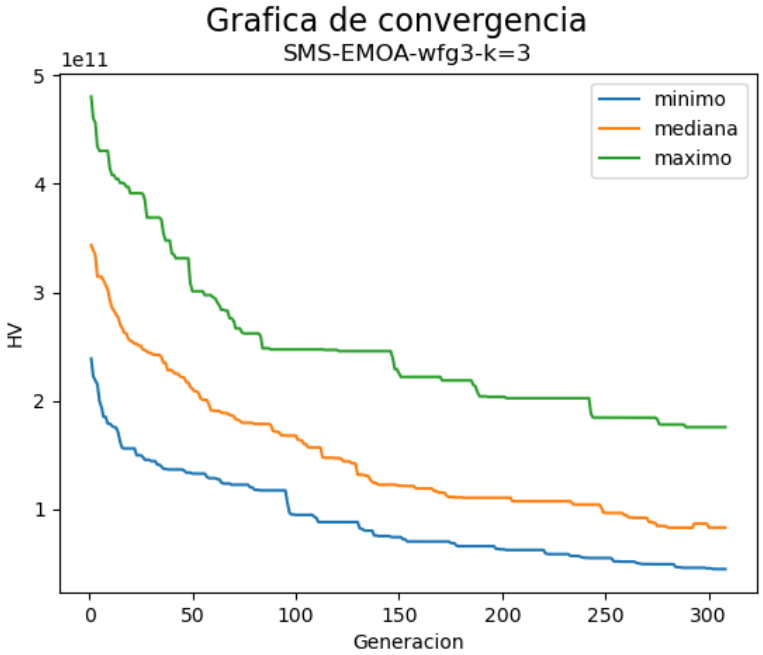
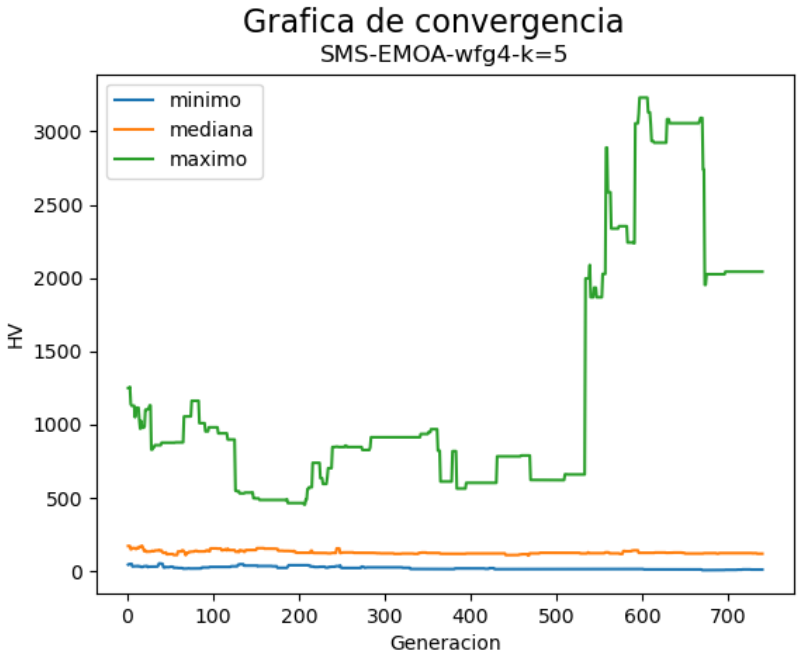
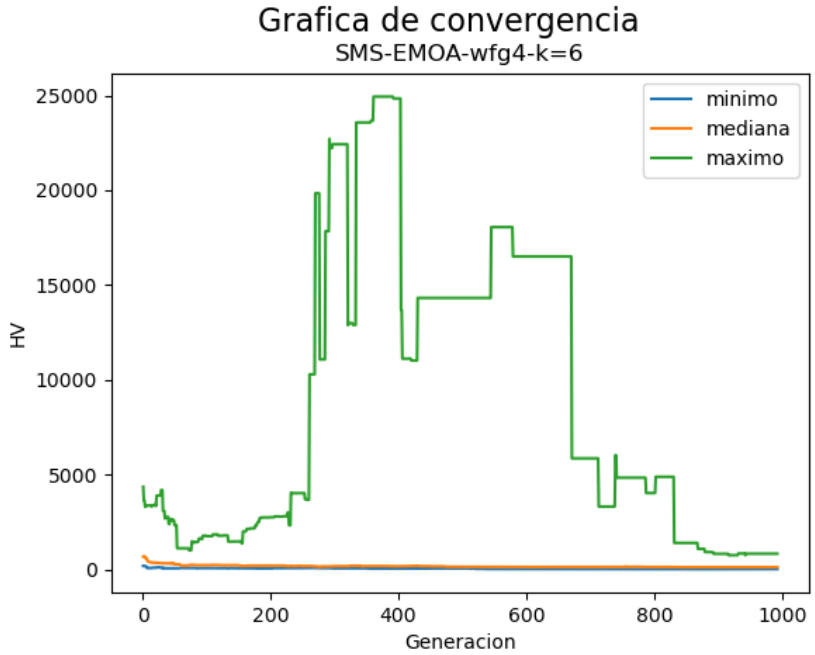
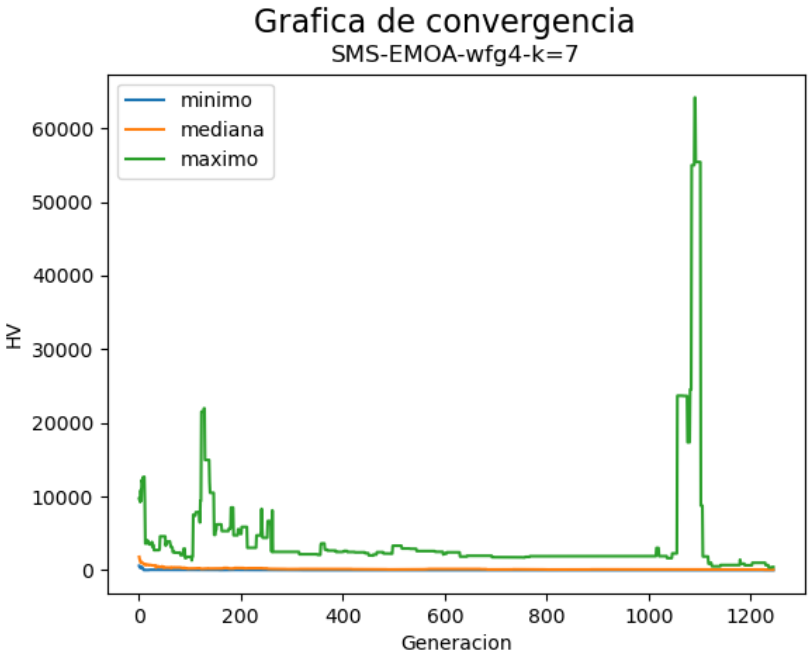
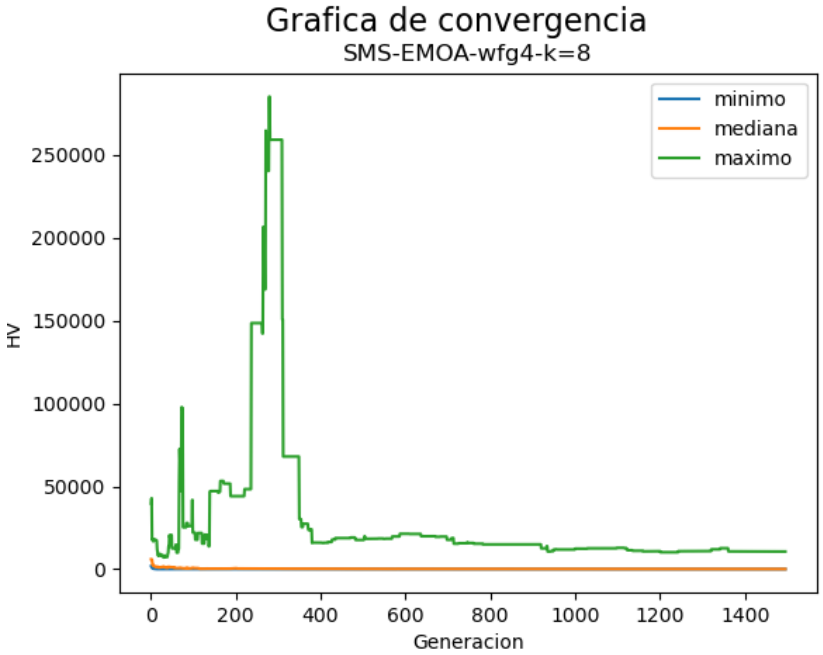
150
200
250
300

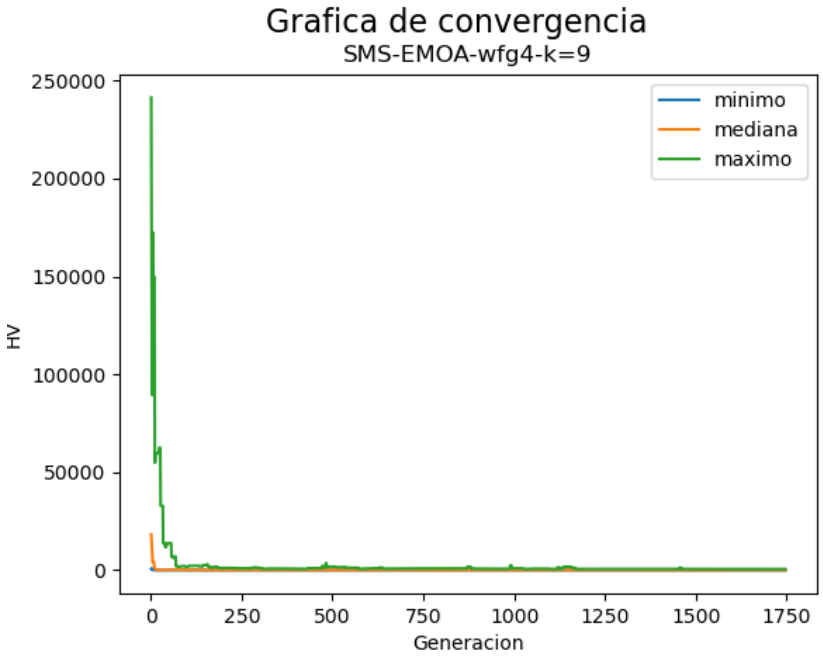

Grafica de convergencia
SMS-EMOA-wfg3-k=3
1e11
5
4
3
2
1
HV
minimo
mediana
maximo
0
50
100
150
200
250
300
Generacion

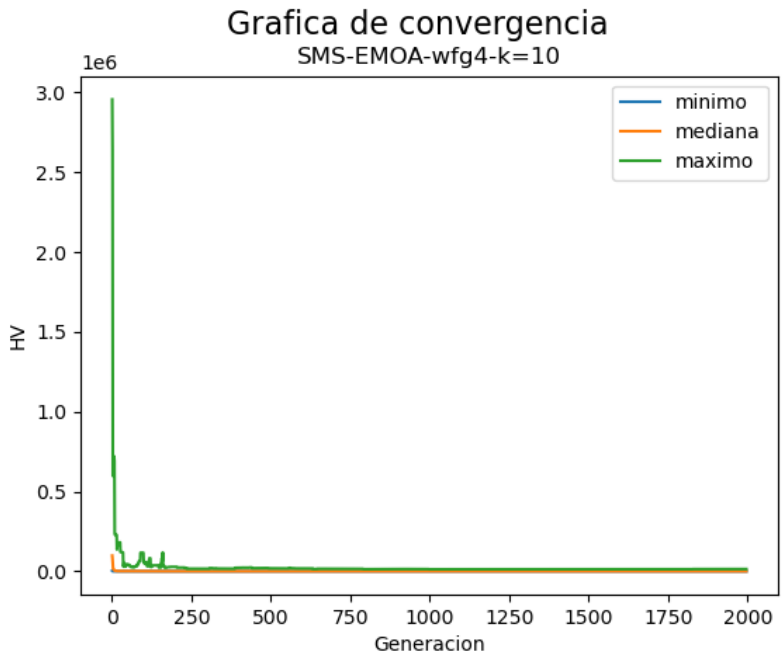

Grafica de convergencia
SMS-EMOA-wfg4-k=5
3000
2500
2000
1500
1000
500
0
HV
minimo
mediana
maximo
0
100
200
300
400
500
600
700
Generacion


Grafica de convergencia
SMS-EMOA-wfg4-k=6
minimo
mediana
maximo
HV
Generacion
0
5000
10000
15000
20000
25000
0
200
400
600
800
1000

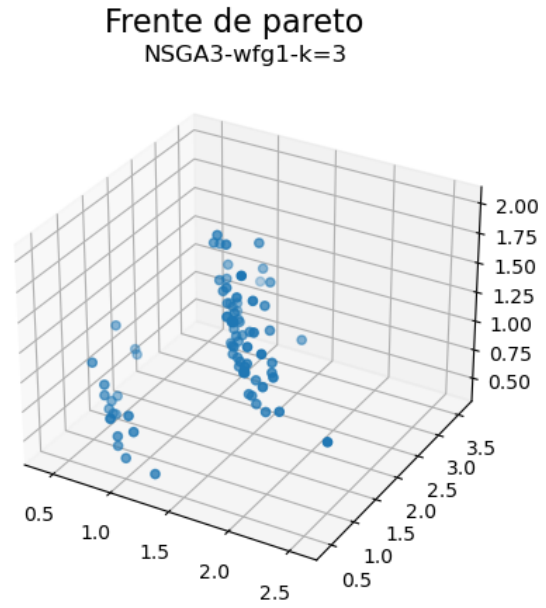

Grafica de convergencia
SMS-EMOA-wfg4-k=7
minimo
mediana
maximo
HV
Generacion
0
10000
20000
30000
40000
50000
60000
0
200
400
600
800
1000
1200

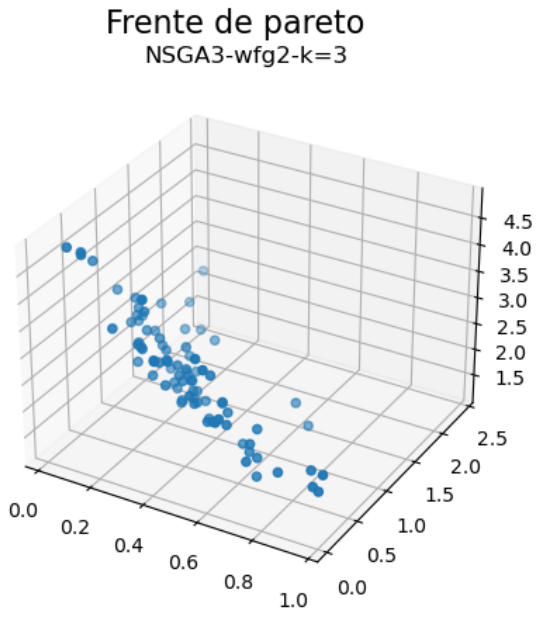

Grafica de convergencia
SMS-EMOA-wfg4-k=8
minimo
mediana
maximo
HV
250000
200000
150000
100000
50000
0
0
200
400
600
800
1000
1200
1400
Generacion

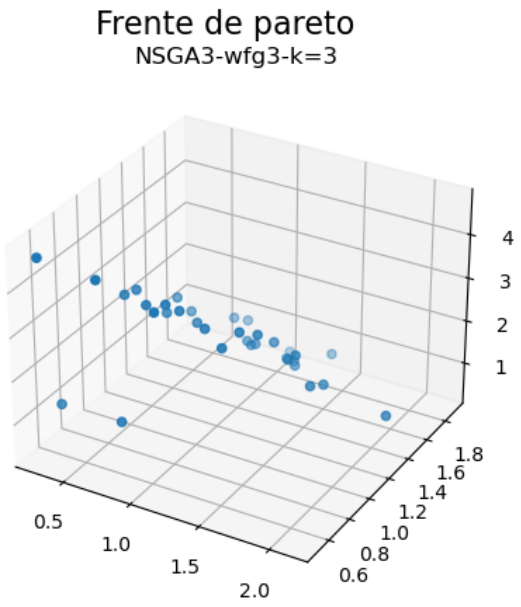

Grafica de convergencia
SMS-EMOA-wfg4-k=9
minimo
mediana
maximo
HV
250000
200000
150000
100000
50000
0
0
250
500
750
1000
1250
1500
1750
Generacion

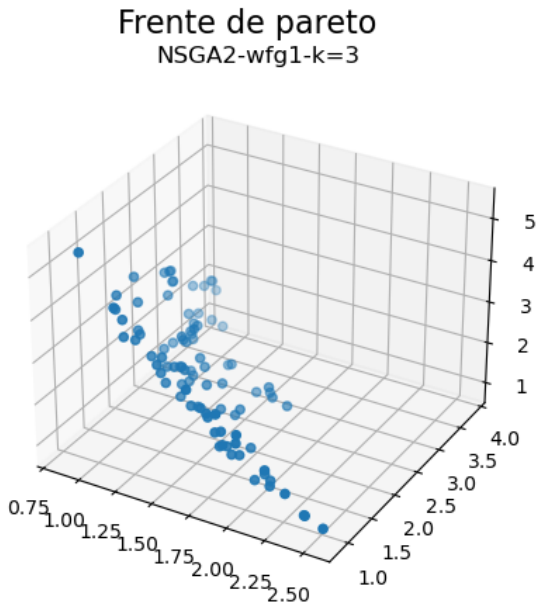

Grafica de convergencia
SMS-EMOA-wfg4-k=10
1e6
3.0
2.5
2.0
1.5
1.0
0.5
0.0
HV
0
250
500
750
1000
1250
1500
1750
2000
Generacion
minimo
mediana
maximo

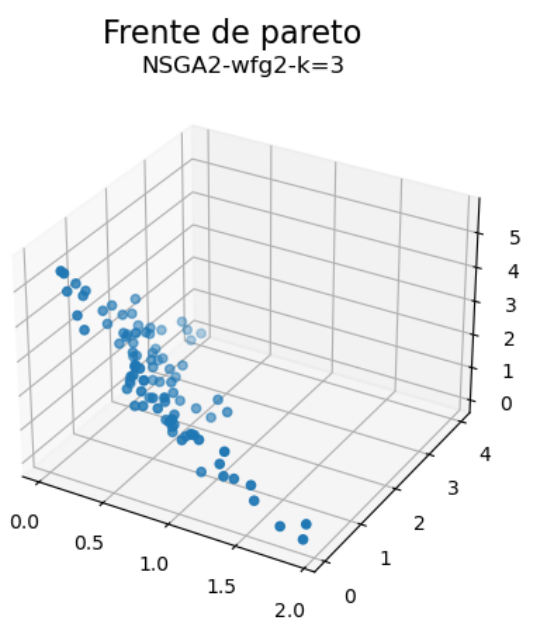
3. Frentes de Pareto

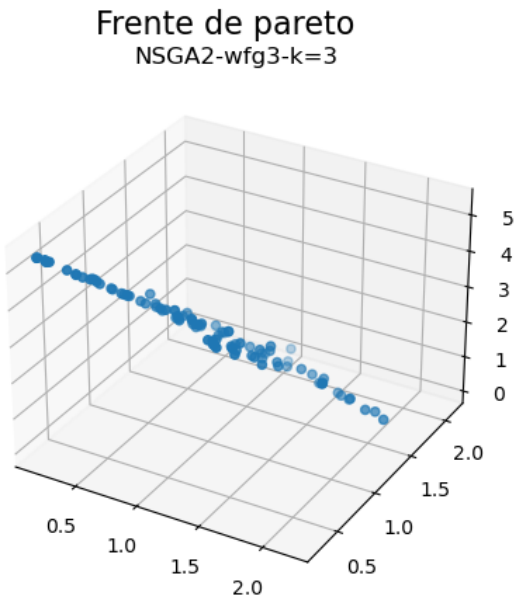


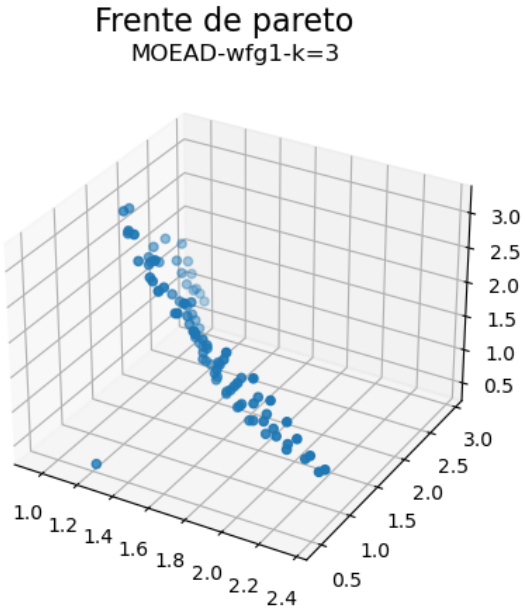


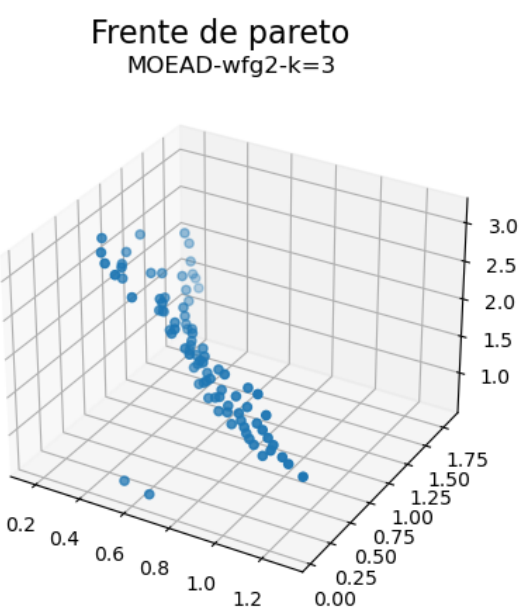

Frente de pareto
NSGA3-wfg3-k=3
4
3
2
1
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.5
1.0
1.5
2.0

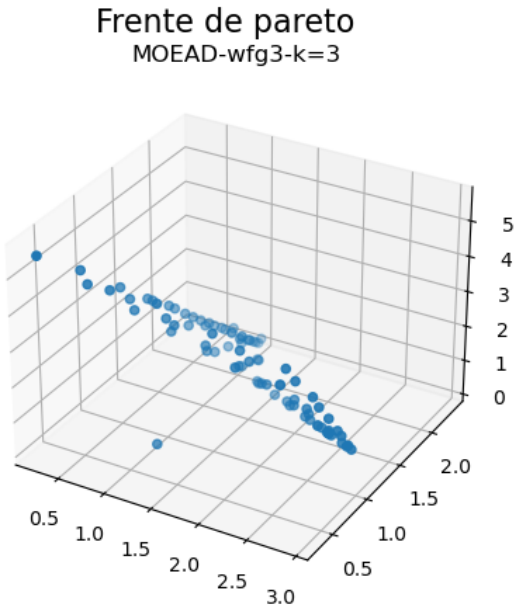

Frente de pareto
NSGA2-wfg1-k=3
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
1.0
1.5
2.0
2.5
3.0
3.5
4.0
1
2
3
4
5

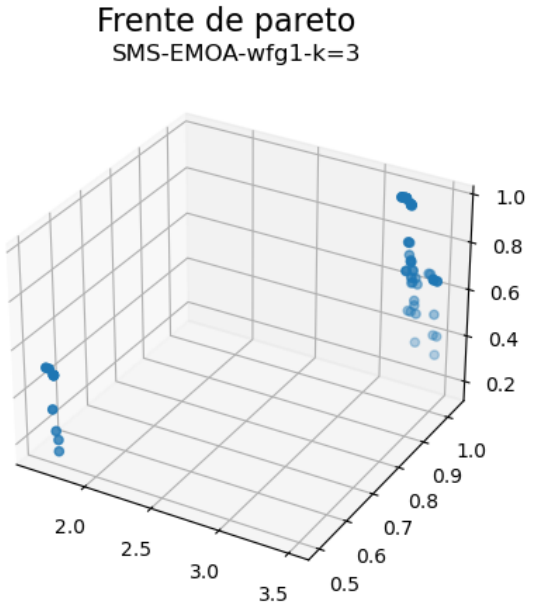

Frente de pareto
NSGA2-wfg2-k=3
0.0
0.5
1.0
1.5
2.0
0
1
2
3
4
0
1
2
3
4
5

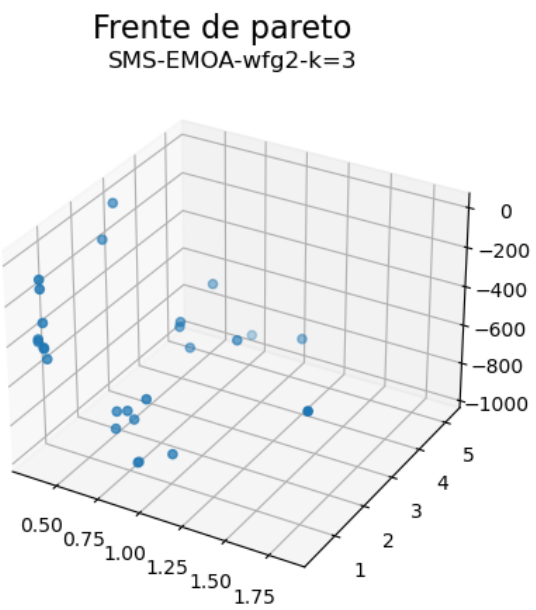

Frente de pareto
NSGA2-wfg3-k=3
5
4
3
2
1
0
2.0
1.5
1.0
0.5
0.5
1.0
1.5
2.0

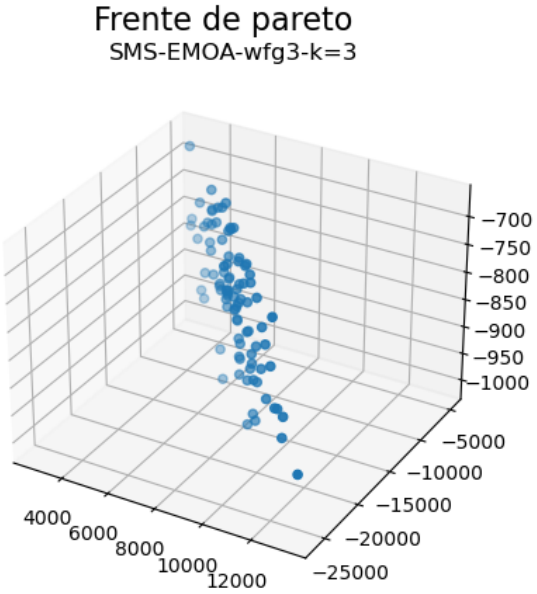

Frente de pareto
MOEAD-wfg1-k=3
3.0
2.5
2.0
1.5
1.0
0.5
3.0
2.5
2.0
1.5
1.0
0.5
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4


Frente de pareto
MOEAD-wfg2-k=3
3.0
2.5
2.0
1.5
1.0
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.2
0.4
0.6
0.8
1.0
1.2

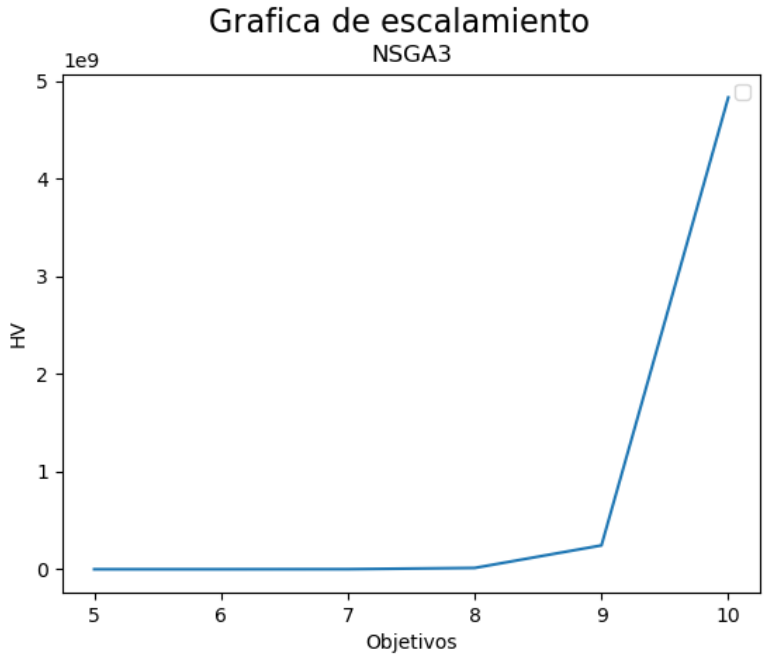

Frente de pareto
MOEAD-wfg3-k=3
5
4
3
2
1
0
2.0
1.5
1.0
0.5
0.5
1.0
1.5
2.0
2.5
3.0

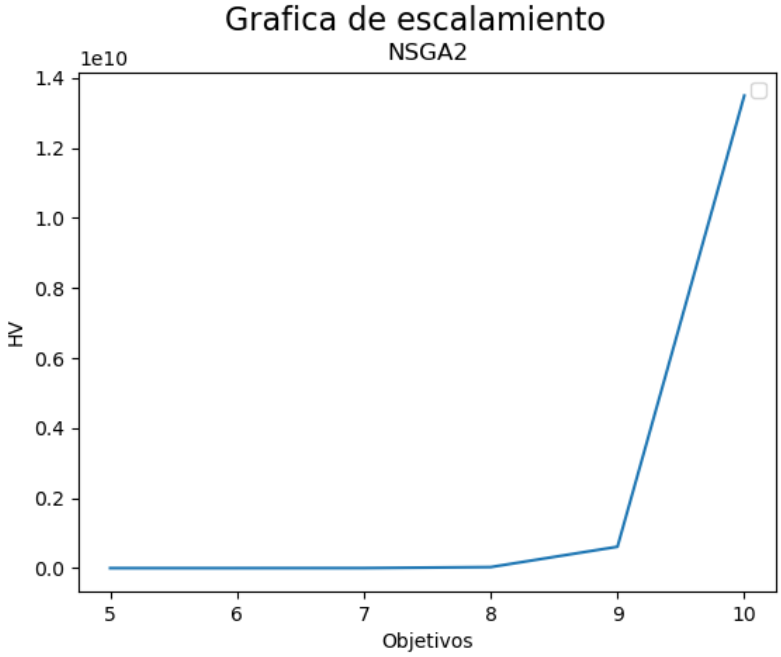

Frente de pareto
SMS-EMOA-wfg1-k=3
1.0
0.8
0.6
0.4
0.2
1.0
0.9
0.8
0.7
0.6
0.5
2.0
2.5
3.0
3.5

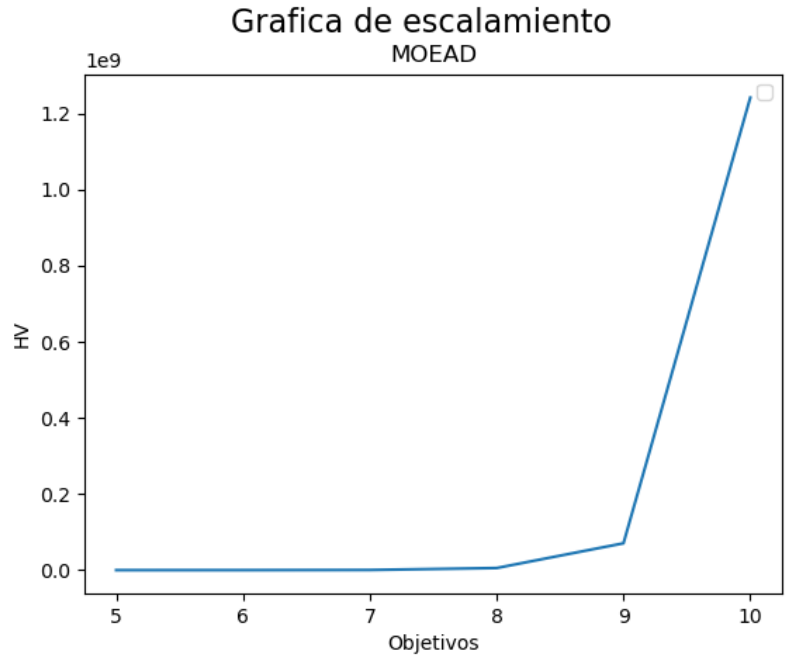

Frente de pareto
SMS-EMOA-wfg2-k=3
0
−200
−400
−600
−800
−1000
5
4
3
2
1
0.50
0.75
1.00
1.25
1.50
1.75

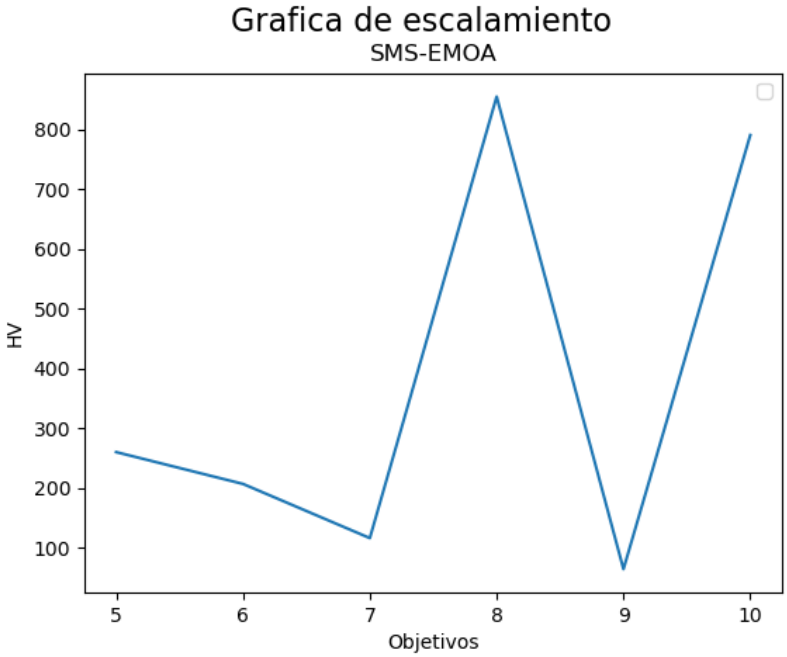

Frente de pareto
SMS-EMOA-wfg3-k=3
−700
−750
−800
−850
−900
−950
−1000
−5000
−10000
−15000
−20000
−25000
4000
6000
8000
10000
12000

4. Gráficos de escalamiento

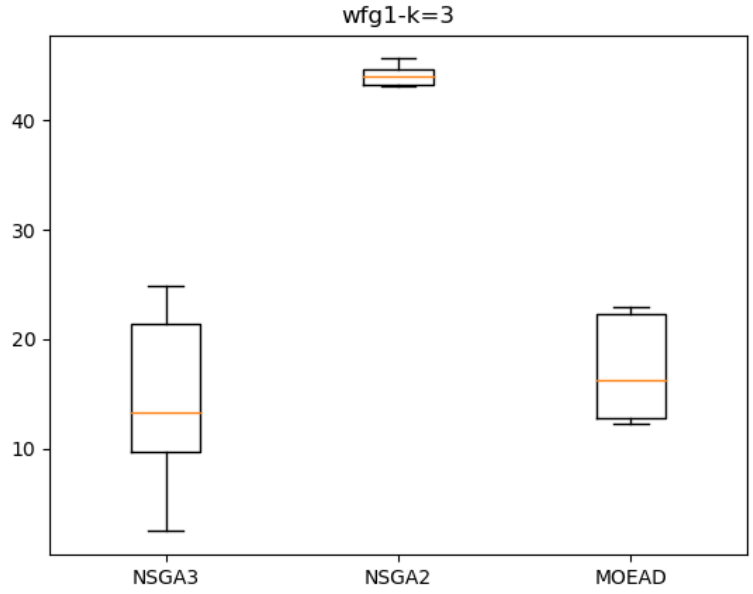


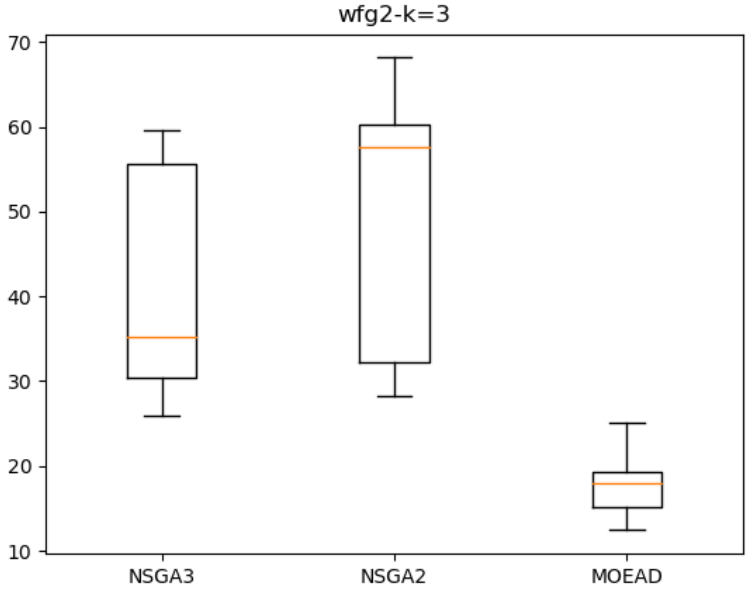


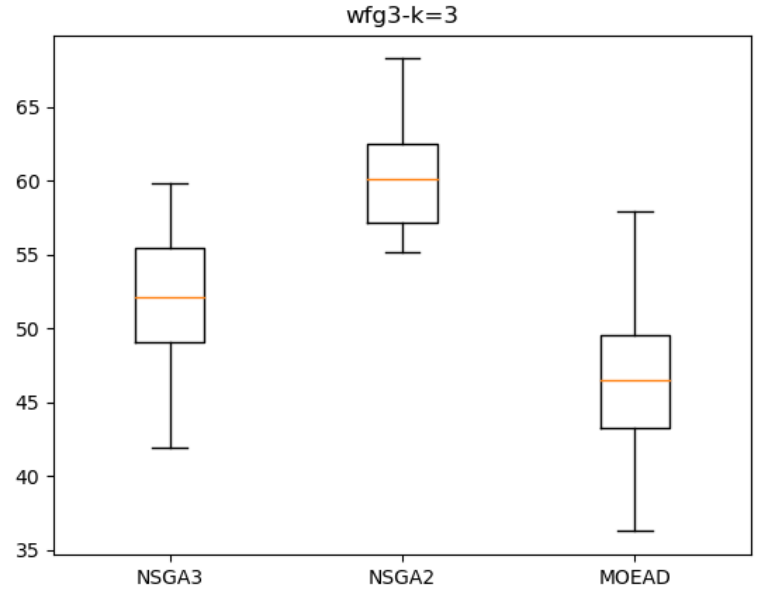

Grafica de escalamiento
MOEAD
1e9
1.2
1.0
0.8
0.6
0.4
0.2
0.0
HV
5
6
7
8
9
10
Objetivos

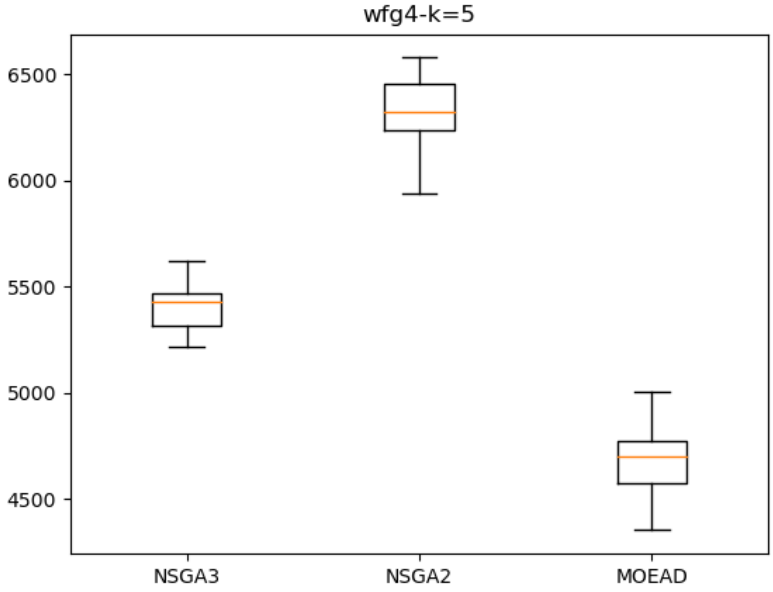

Grafica de escalamiento
SMS-EMOA
800
700
600
500
400
300
200
100
HV
5
6
7
8
9
10
Objetivos

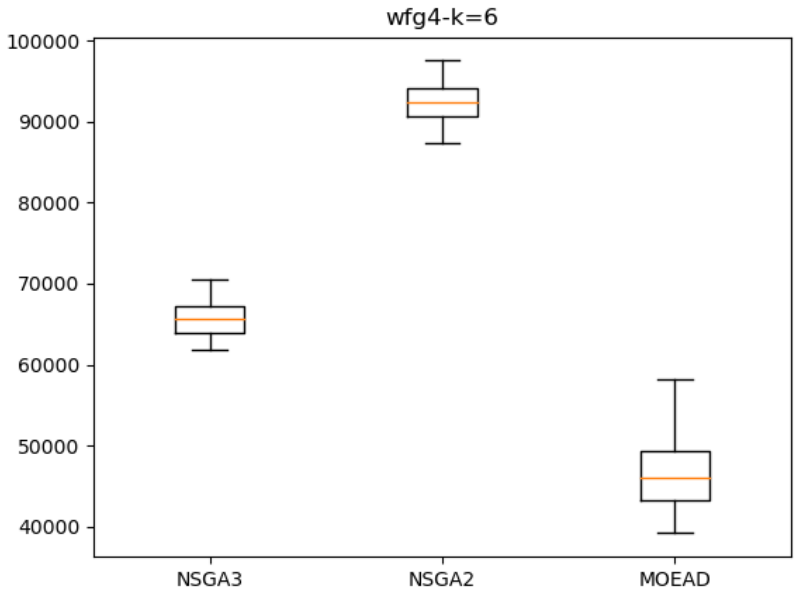
5. Box-plots

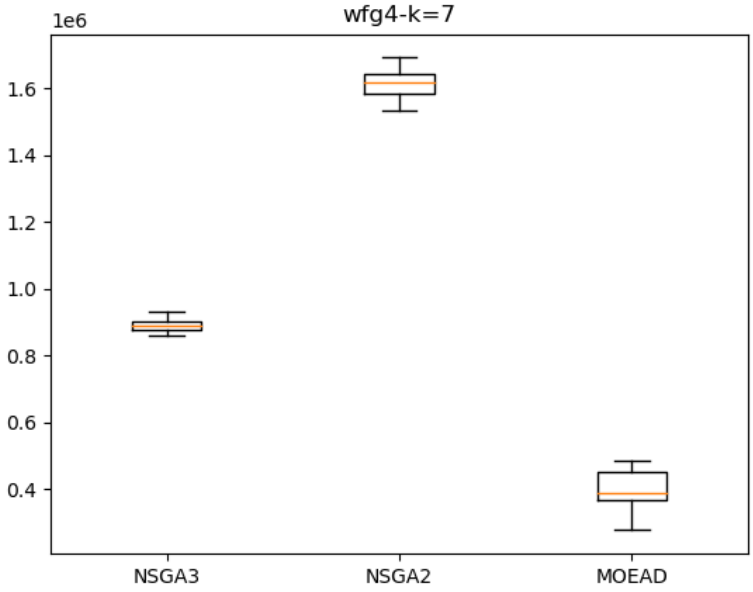

wfg1-k=3
40
30
20
10
NSGA3
NSGA2
MOEAD

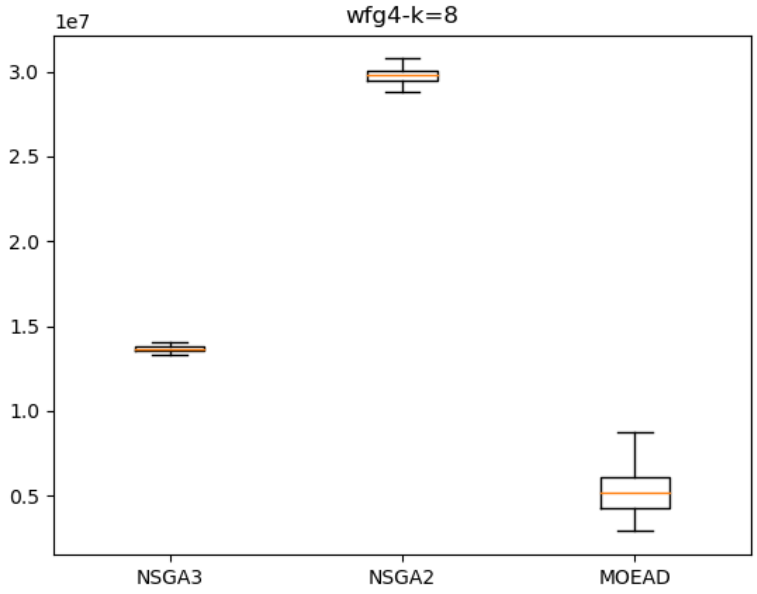

wfg2-k=3
70
60
50
40
30
20
10
NSGA3
NSGA2
MOEAD

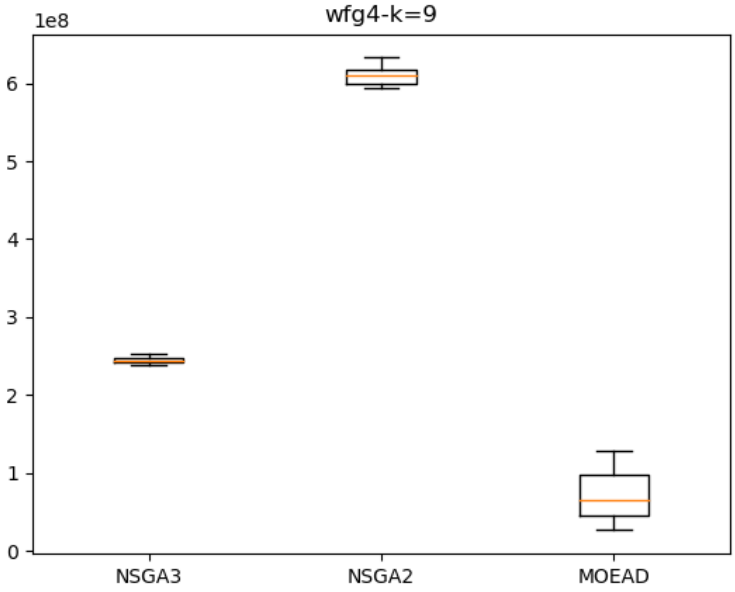

wfg3-k=3
65
60
55
50
45
40
35
NSGA3
NSGA2
MOEAD

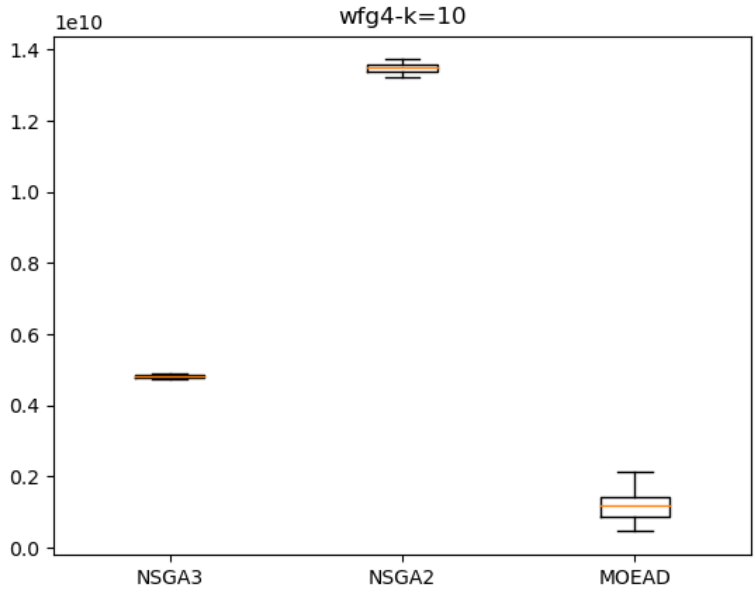

wfg4-k=5
6500
6000
5500
5000
4500
NSGA3
NSGA2
MOEAD


wfg4-k=6
100000
90000
80000
70000
60000
50000
40000
NSGA3
NSGA2
MOEAD


wfg4-k=7
1e6
1.6
1.4
1.2
1.0
0.8
0.6
0.4
NSGA3
NSGA2
MOEAD


wfg4-k=8
1e7
3.0
2.5
2.0
1.5
1.0
0.5
NSGA3
NSGA2
MOEAD


wfg4-k=9
1e8
6
5
4
3
2
1
0
NSGA3
NSGA2
MOEAD


wfg4-k=10
1e10
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
NSGA3
NSGA2
MOEAD

6. Estadísticos

Cuadro 3: Estadisticos para SMS-EMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.78 (1.8)	45.22 (8.05)	50.27 (5.4)	5065.67 (432.59)	63965.61 (8032.22)	857038.15 (112496.57)	12680386.28 (2116981.99)	228410745.09 (39746398.08)	4500519776.9 (842655235.42)
1	4.73 (3.29)	27.08 (2.59)	39.99 (5.74)	5274.89 (538.55)	58713.4 (6870.07)	830516.86 (124165.69)	12631938.25 (2213309.88)	226101262.19 (41785909.62)	4440918355.43 (885482260.91)
2	4.24 (3.67)	26.55 (2.19)	49.49 (7.78)	5025.62 (555.35)	61575.39 (7844.55)	806473.6 (129074.19)	12514162.42 (2340147.99)	228780565.91 (41085714.14)	4528211837.95 (884228322.01)
3	4.65 (4.79)	50.48 (7.59)	41.31 (7.2)	5352.25 (539.12)	62975.43 (7921.54)	834328.56 (112498.11)	12342402.8 (2249355.68)	224340579.5 (38161435.87)	4427535325.46 (887941607.86)
4	3.29 (3.6)	50.53 (8.98)	45.51 (6.6)	5032.09 (549.78)	61967.56 (7522.59)	823215.51 (130962.79)	12877678.91 (2134203.02)	229187569.83 (43962309.56)	4376752344.63 (864508116.81)
5	8.13 (7.8)	53.43 (8.49)	43.76 (6.34)	5176.02 (558.21)	58341.8 (7149.77)	833687.93 (120251.34)	12804680.08 (2036550.04)	224350513.11 (40845154.06)	4375752088.63 (872181553.14)
6	5.2 (5.49)	28.42 (2.84)	38.59 (4.06)	5182.66 (572.64)	62559.47 (7946.42)	842683.75 (122012.96)	12776823.61 (2092212.6)	227075121.37 (39907426.95)	4471639941.02 (886750300.08)
7	12.42 (10.5)	50.49 (7.04)	47.46 (7.72)	4955.35 (526.15)	63172.57 (8098.41)	845437.5 (123338.85)	12434797.02 (2034514.98)	226168271.72 (38094995.69)	4505507424.81 (870159818.35)
8	7.07 (8.42)	56.84 (7.0)	45.82 (8.02)	5021.25 (566.24)	66162.7 (8908.95)	834680.84 (129968.43)	12541214.48 (2263338.32)	218665104.45 (42368183.0)	4444152031.64 (940805255.18)
9	8.18 (4.82)	30.92 (2.46)	44.45 (4.92)	5248.82 (533.04)	61377.72 (7917.01)	815767.67 (119173.73)	12811823.79 (2256972.02)	224578134.67 (39756554.18)	4366009809.81 (909253258.71)
10	2.9 (3.12)	36.82 (2.75)	43.18 (8.25)	5101.38 (573.58)	58618.06 (7356.89)	812637.39 (114592.87)	12655516.76 (2380332.66)	228209795.78 (39643429.72)	4437561161.35 (835080473.26)
11	1.19 (0.65)	52.86 (6.17)	44.01 (6.94)	5174.89 (527.08)	61531.41 (8059.87)	824550.56 (133680.65)	12354848.53 (2256859.25)	224730374.23 (44864854.88)	4335720433.04 (890277030.84)
12	1.83 (1.65)	27.2 (2.76)	44.37 (5.95)	5181.73 (525.9)	64717.81 (8412.66)	814884.79 (112930.42)	12513536.35 (2215552.62)	222950275.1 (42501078.23)	4496119333.11 (845260657.63)
13	1.72 (0.97)	24.77 (2.02)	44.78 (6.9)	5484.2 (620.73)	63162.3 (8099.15)	863659.91 (112435.41)	12375772.55 (1973837.41)	223781538.43 (40566753.19)	4654673496.48 (821240542.25)
14	10.24 (10.07)	29.03 (2.58)	40.48 (5.31)	5158.84 (593.3)	61115.24 (7430.74)	838841.8 (117488.26)	12869766.12 (2461109.01)	221715737.85 (44594703.9)	4427049459.82 (868130155.29)
15	11.22 (12.71)	30.55 (2.54)	41.49 (5.67)	5180.89 (560.32)	66159.28 (8799.47)	882444.71 (129635.2)	12657276.97 (2292341.23)	223586337.13 (40251004.94)	4331012972.33 (890181594.92)
16	6.48 (5.0)	29.1 (2.46)	39.13 (5.17)	5104.58 (558.4)	60581.44 (7819.34)	839647.53 (124045.52)	12551412.24 (2352769.82)	235482379.9 (41828868.11)	4584169927.24 (935467142.2)
17	2.09 (2.27)	50.96 (7.48)	49.96 (7.14)	5160.23 (533.43)	61837.94 (6881.89)	848986.58 (103853.91)	12918915.32 (2293487.51)	230458044.85 (37153839.89)	4467490165.23 (842475019.93)
18	5.31 (4.42)	51.98 (8.96)	44.24 (6.66)	5016.82 (534.01)	59638.85 (7236.19)	812261.85 (116528.82)	12501102.38 (2174144.84)	227044158.44 (45607692.2)	4401148984.82 (823921215.75)
19	6.12 (7.45)	30.18 (2.48)	51.04 (7.71)	5031.52 (563.98)	59769.41 (7632.97)	879046.35 (120925.5)	12482908.09 (2372617.53)	227267299.61 (42553906.61)	4445678829.99 (857748089.17)

Cuadro 4: Estadisticos para NSGA2

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	22.87 (18.1)	54.61 (8.22)	60.5 (7.92)	5657.48 (535.91)	86337.87 (10838.14)	1425059.95 (231348.06)	26370503.92 (4790677.0)	540687866.77 (108498205.9)	12193213974.68 (2382329099.19)
1	23.33 (18.19)	56.1 (7.95)	51.27 (8.04)	6143.9 (605.03)	87538.24 (10986.01)	1437469.65 (232662.25)	25185397.39 (4557345.28)	539429169.13 (97423441.77)	12136830388.4 (2127852963.49)
2	12.62 (10.92)	26.7 (6.2)	47.68 (7.51)	6111.86 (611.79)	87315.37 (10405.04)	1468892.97 (254451.16)	27004312.3 (4989242.7)	550991531.87 (101715155.07)	12239346403.41 (2250441391.44)
3	19.14 (15.57)	56.19 (7.63)	53.13 (8.12)	6017.74 (602.69)	87868.8 (10172.45)	1483092.0 (254637.41)	26404417.91 (5460185.93)	541208406.31 (101276158.15)	12293586699.97 (2313729086.69)
4	15.55 (13.68)	54.01 (7.75)	46.79 (6.88)	6052.08 (614.7)	92170.78 (11764.15)	1465830.14 (230060.57)	25760259.38 (4423541.06)	540986359.51 (101951867.84)	12269397953.3 (2128077490.73)
5	20.7 (19.37)	64.0 (7.6)	55.27 (9.04)	6175.53 (582.48)	86011.27 (12179.52)	1549370.01 (306645.68)	25878349.35 (5120349.74)	561260070.96 (104208425.38)	12128411025.76 (2191705224.78)
6	13.24 (10.5)	27.46 (2.74)	55.41 (8.35)	5906.41 (623.73)	85778.17 (11094.07)	1468137.06 (231299.22)	27112305.84 (4827028.25)	552099437.67 (104332481.97)	12044769585.17 (2358907684.13)
7	18.82 (10.26)	62.02 (8.32)	51.94 (8.06)	5919.83 (614.84)	81487.4 (10096.67)	1417812.01 (228795.84)	25005624.42 (4870567.78)	561456911.39 (105115754.98)	12235159191.78 (2260024151.37)
8	21.07 (17.56)	26.0 (2.84)	50.44 (7.44)	6217.85 (642.53)	90040.14 (12599.8)	1434394.74 (241099.78)	27167665.36 (5043323.42)	545596872.93 (101406140.2)	12141638733.15 (2288454600.96)
9	22.95 (17.29)	56.75 (6.8)	49.38 (6.61)	5881.28 (592.42)	89577.56 (11975.85)	1534765.09 (233481.89)	26284763.74 (5240600.57)	554354493.07 (105001235.79)	12496750441.75 (2296710561.06)
10	26.15 (18.65)	61.04 (5.84)	48.29 (7.41)	5973.5 (637.51)	85275.89 (11930.37)	1380419.57 (235213.89)	26475717.03 (5044205.55)	535220532.19 (110200469.38)	12307426768.99 (2187348144.88)
11	24.95 (16.19)	31.09 (2.4)	52.87 (7.75)	5741.59 (580.83)	88246.4 (12801.07)	1504143.31 (262820.0)	27173446.15 (4924544.46)	538224157.21 (103014906.59)	12454576012.65 (2184822585.84)
12	13.06 (14.9)	27.77 (3.39)	53.26 (8.56)	6223.89 (606.71)	87056.37 (10004.32)	1493151.63 (243340.33)	26515527.46 (4783087.74)	560671385.58 (113192016.74)	12123099009.81 (2270266294.04)
13	21.88 (18.06)	55.96 (6.71)	46.61 (8.36)	6302.5 (521.64)	84387.24 (11166.01)	1498381.5 (220153.46)	26118776.41 (4846945.76)	538147388.98 (104769430.7)	11906917699.73 (2239337710.75)
14	21.81 (18.2)	60.2 (7.79)	53.57 (8.15)	6218.12 (617.81)	83611.39 (10304.24)	1398705.84 (225635.68)	26982919.07 (4953047.83)	534093028.02 (93023864.83)	12022039766.1 (2292811117.04)
15	25.86 (18.75)	28.4 (2.69)	55.46 (7.46)	6002.01 (559.67)	88879.04 (11751.74)	1450972.87 (244051.19)	27186323.2 (4984780.86)	548894241.16 (100162282.95)	12545365601.97 (2322527460.67)
16	30.03 (18.85)	29.1 (2.25)	48.76 (8.18)	6039.15 (612.07)	82323.85 (10057.74)	1466257.01 (243924.09)	26935436.63 (5058577.84)	532604438.88 (94580220.04)	11932956592.4 (2197150365.32)
17	20.78 (16.57)	54.25 (7.64)	60.27 (9.28)	6003.37 (550.93)	82904.37 (10412.62)	1490128.6 (241249.62)	26780314.38 (4434127.35)	563754234.02 (105104807.11)	12175463758.39 (2218900244.51)
18	8.95 (6.9)	30.94 (2.32)	49.05 (6.8)	5799.97 (601.88)	84386.94 (11330.57)	1410705.65 (215906.56)	28296346.24 (5425661.73)	557308430.14 (109385189.97)	12434020702.98 (2097995847.94)
19	22.37 (17.22)	48.03 (9.11)	53.14 (7.28)	6122.22 (619.11)	85960.99 (10841.39)	1513928.24 (253849.16)	26914436.75 (4784210.56)	544310241.23 (99923551.97)	12201129899.56 (2149002589.71)

Cuadro 5: Estadisticos para MOEAD

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	10.14 (4.03)	11.77 (1.05)	46.23 (4.59)	4300.9 (450.67)	36032.57 (6727.48)	398111.51 (43879.33)	4351644.35 (693229.01)	56920856.0 (11424377.26)	527096805.33 (207600486.04)
1	12.02 (4.73)	15.82 (1.8)	39.33 (6.34)	4503.05 (278.58)	38400.65 (7046.89)	391501.17 (111848.51)	5164931.68 (487016.91)	61033510.69 (5555046.14)	978989089.06 (174528983.08)
2	9.86 (4.83)	15.13 (1.28)	41.52 (7.79)	4448.31 (401.68)	42650.51 (4301.14)	471636.83 (80173.58)	3276830.18 (795778.16)	93033448.94 (6308272.25)	1842053897.99 (221101467.2)
3	13.78 (7.67)	11.66 (1.36)	33.25 (4.09)	3967.16 (515.73)	36865.01 (6418.28)	367928.91 (84000.92)	5544241.08 (600411.02)	34708535.44 (3811210.72)	1850168253.08 (402839229.09)
4	8.52 (3.75)	11.36 (1.19)	34.22 (5.52)	4780.26 (242.84)	47042.74 (4128.89)	335657.63 (47422.48)	3767580.18 (513132.07)	48676167.33 (13560427.09)	702868422.73 (71175791.58)
5	9.94 (4.24)	16.44 (1.18)	36.42 (7.85)	4269.75 (393.21)	43829.97 (6096.11)	389423.54 (39770.82)	3238430.24 (353875.83)	18691341.3 (7458375.83)	1263626852.14 (211360256.72)
6	8.82 (3.89)	14.42 (1.73)	38.29 (5.01)	4465.7 (421.99)	34500.97 (5060.59)	301265.11 (70430.62)	4681761.94 (652987.45)	37846282.57 (8513263.54)	654781673.6 (155434531.71)
7	7.51 (2.97)	12.38 (1.71)	30.28 (4.1)	4585.49 (495.99)	36490.64 (7272.67)	352484.39 (52593.76)	4874361.37 (625506.68)	97169632.14 (15310388.07)	1064572781.67 (163628554.16)
8	16.57 (8.66)	17.43 (1.35)	40.25 (9.81)	4255.41 (546.08)	37815.3 (3860.01)	282053.85 (55730.69)	2406497.52 (788794.06)	49010785.35 (18145842.84)	1040576510.52 (193190599.02)
9	9.28 (3.67)	25.2 (1.73)	48.63 (9.6)	4478.31 (384.12)	44881.15 (4726.88)	318762.88 (49607.12)	2478410.17 (338793.73)	88202772.67 (5473601.26)	770528355.74 (254847281.19)
10	8.34 (3.92)	23.24 (1.99)	34.74 (4.59)	4363.96 (451.22)	50140.24 (7831.17)	389675.86 (76022.23)	3596009.46 (432193.39)	97684611.44 (6958031.69)	652884251.25 (206870911.87)
11	17.76 (7.16)	16.52 (2.08)	32.67 (5.34)	4300.71 (396.07)	44460.79 (7221.75)	333680.58 (77474.29)	6561186.38 (933834.41)	43753785.09 (4536663.85)	1194831935.95 (122343792.02)
12	12.06 (5.83)	11.12 (1.1)	41.34 (5.69)	4832.62 (277.85)	28875.16 (7482.94)	159582.16 (48364.7)	2647291.23 (302709.77)	59841470.48 (13865950.43)	1451587546.24 (215176334.86)
13	16.94 (8.13)	18.15 (1.4)	40.77 (8.62)	4574.99 (266.7)	45180.82 (3780.49)	258913.96 (73442.46)	4562506.99 (344958.34)	120193416.81 (12418157.59)	767259370.27 (149884989.53)
14	15.12 (8.15)	17.48 (1.48)	41.03 (4.6)	4822.9 (381.78)	28452.61 (5176.08)	350112.22 (96270.59)	6953982.43 (794470.75)	24096436.2 (6416257.65)	374444555.18 (110639636.29)
15	15.9 (8.12)	14.84 (2.73)	38.3 (6.22)	4576.17 (326.45)	46309.96 (5315.91)	413961.89 (80587.6)	4192625.87 (697186.35)	30543101.22 (10315656.78)	448324368.18 (235445108.6)
16	12.01 (5.27)	20.14 (1.75)	37.21 (6.33)	4489.13 (502.87)	40652.82 (5529.03)	341143.46 (47499.88)	7840167.32 (1003735.99)	121211938.12 (15541861.65)	959308528.19 (271339327.46)
17	15.34 (8.18)	21.56 (4.62)	47.22 (7.85)	4543.04 (429.43)	29697.13 (8090.27)	365925.51 (48334.33)	5595559.56 (1041003.3)	40824922.69 (11075391.04)	1319091083.19 (259995179.5)
18	9.25 (4.07)	16.62 (1.83)	32.96 (6.75)	3978.17 (582.94)	45659.96 (3377.54)	231677.85 (90580.6)	2892665.05 (1105669.19)	28384279.34 (4659062.03)	2381437542.45 (241292270.56)
19	15.61 (7.47)	14.03 (1.43)	34.89 (4.56)	4617.99 (491.45)	37688.66 (8150.71)	132292.2 (43848.05)	9026505.95 (1746234.81)	73425345.27 (19943475.34)	1068643733.83 (271631299.19)

Cuadro 6: Estadisticos para SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.88 (0.05)	35079.48 (4096.35)	124333006308.89 (45716139732.45)	461.68 (136.61)	883.57 (695.27)	182.9 (660.26)	65.82 (862.14)	62.33 (1517.12)	222.74 (8074.91)
1	1.38 (0.0)	25897.75 (10051.58)	133947902141.82 (53186245546.77)	39.96 (38.91)	102.14 (65.61)	538.74 (197.4)	2798.52 (1552.28)	56.56 (72.31)	62.72 (391.39)
2	1.6 (0.02)	60463.03 (11770.88)	211874931031.09 (58341875046.99)	91.57 (20.75)	128.09 (73.99)	33.27 (53.48)	42.16 (266.55)	18.45 (187.62)	76.42 (1016.88)
3	2.33 (0.0)	124.12 (131.19)	112275210886.19 (31376901196.59)	70.29 (33.88)	103.37 (44.05)	337.56 (646.79)	1727.39 (767.18)	39.03 (133.22)	124.03 (593.62)
4	1.48 (0.07)	1851.35 (2017.43)	134791977900.85 (39834173309.17)	894.27 (1021.66)	485.04 (102.52)	210.83 (1121.63)	19341.04 (12391.1)	885.05 (11257.96)	378.41 (2887.78)
5	2.35 (0.03)	13445.01 (5830.14)	130544654859.22 (70965630297.38)	208.34 (48.46)	59.88 (46.84)	220.0 (238.5)	42.88 (193.22)	14.15 (80.32)	34.77 (260.03)
6	2.15 (0.02)	37043.16 (5957.56)	209457975324.33 (63485702790.59)	41.21 (14.25)	531.76 (194.98)	1208.66 (2472.16)	780.44 (785.63)	218.36 (1226.46)	2506.01 (11367.02)
7	2.3 (0.11)	19667.56 (21781.61)	170254694266.06 (67728031529.94)	55.0 (24.08)	140.04 (77.34)	311.13 (484.77)	788.86 (930.2)	256.7 (5311.62)	2879.12 (88703.67)
8	1.96 (0.0)	11656.18 (7302.68)	227927011705.82 (72491275035.42)	160.07 (43.61)	276.87 (186.26)	356.7 (249.45)	394.23 (386.09)	118.13 (238.83)	596.75 (2714.93)
9	2.22 (0.0)	13729.64 (3487.52)	241252673409.44 (70894346930.93)	343.16 (236.84)	135.96 (263.24)	62.06 (188.22)	1314.84 (6236.3)	1030.56 (3015.85)	1439.37 (8038.1)
10	2.29 (0.0)	9615.47 (6154.62)	127608379127.9 (28798989873.82)	31.54 (11.32)	309.46 (148.8)	237.3 (239.98)	49.9 (155.73)	733.81 (852.65)	3662.3 (13618.48)
11	1.86 (0.0)	30119.41 (6806.34)	137132856359.74 (53871564315.39)	98.17 (94.22)	170.62 (98.83)	60.92 (133.3)	2788.65 (9411.83)	104.21 (462.85)	819.13 (4649.51)
12	2.36 (0.02)	10822.59 (425.94)	99477254894.45 (51620499254.09)	666.45 (158.29)	141.2 (69.67)	358.06 (856.84)	42.61 (247.59)	64.7 (583.61)	136.73 (2399.1)
13	1.81 (0.0)	15299.83 (4384.3)	166696713301.28 (48064413070.86)	268.88 (85.99)	1016.94 (1364.01)	92.71 (82.15)	296.79 (185.04)	69.55 (571.14)	188.37 (3682.45)
14	1.63 (0.0)	10891.41 (1587.58)	211753846451.27 (60242476311.77)	53.41 (30.56)	119.65 (121.97)	205.3 (616.87)	236.66 (507.16)	1345.21 (8953.19)	18444.49 (33834.11)
15	2.34 (0.0)	4223.65 (2062.35)	149005087441.15 (92681600905.78)	272.88 (229.59)	8432.16 (7946.58)	3500.52 (7175.76)	17661.54 (46671.83)	364.5 (3800.87)	4137.58 (42447.33)
16	2.01 (0.0)	14005.91 (666.01)	112734418666.42 (35087238168.38)	115.45 (57.61)	161.78 (85.45)	80.84 (160.16)	29.59 (211.21)	47.84 (696.89)	155.88 (3660.8)
17	1.86 (0.0)	11914.49 (9763.13)	227860960927.87 (44287489635.48)	134.61 (33.6)	113.4 (100.34)	38.46 (219.69)	140.12 (682.43)	922.13 (1730.97)	1811.2 (13686.56)
18	2.29 (0.01)	2594.19 (2304.51)	92176658105.48 (40511825104.41)	236.04 (261.72)	829.2 (430.22)	364.07 (167.84)	158.84 (388.58)	135.22 (1000.37)	325.48 (4274.03)
19	2.19 (0.05)	24012.91 (9033.94)	146297709586.34 (73076062935.6)	131.76 (13.37)	352.06 (714.65)	165.9 (110.79)	500.65 (1114.08)	93.7 (922.39)	308.45 (8236.39)

7. Pruebas de hipótesis

Cuadro 7: Wilkoxon Rank-Sum para SMS-EMOA-NSGA2

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.454833e-53	3.590368e-95	8.540339e-78	1.605830e-181	7.978827e-269	0.0	0.0	0.0	0.0
1	1.577679e-37	5.006526e-120	4.623533e-81	7.205781e-194	6.759461e-285	0.0	0.0	0.0	0.0
2	1.883297e-25	1.842850e-21	1.115126e-02	1.029393e-208	8.948819e-290	0.0	0.0	0.0	0.0
3	3.308407e-38	1.819004e-88	1.314359e-76	4.171493e-190	2.046913e-293	0.0	0.0	0.0	0.0
4	7.547704e-33	1.959499e-13	7.981055e-06	1.102223e-205	3.742988e-286	0.0	0.0	0.0	0.0
5	5.445971e-13	1.248926e-102	2.324541e-69	1.256493e-209	1.116771e-274	0.0	0.0	0.0	0.0
6	9.354688e-28	3.192043e-38	1.812704e-102	2.327768e-183	1.926943e-283	0.0	0.0	0.0	0.0
7	4.994903e-34	3.557875e-111	3.920367e-25	1.236996e-195	2.239387e-265	0.0	0.0	0.0	0.0
8	3.974563e-27	1.762641e-123	4.191519e-21	1.655910e-210	1.004232e-257	0.0	0.0	0.0	0.0
9	9.625655e-34	2.318894e-118	9.608538e-44	5.770888e-165	4.597070e-270	0.0	0.0	0.0	0.0
10	5.361075e-55	1.078775e-121	6.958839e-24	1.755641e-201	1.205787e-271	0.0	0.0	0.0	0.0
11	1.326285e-75	2.386428e-122	1.879124e-66	2.214479e-169	5.453547e-273	0.0	0.0	0.0	0.0
12	2.677593e-31	1.475194e-18	1.497823e-65	6.749469e-198	5.072035e-278	0.0	0.0	0.0	0.0
13	7.918692e-56	6.408451e-126	8.263049e-10	1.012837e-210	2.891608e-249	0.0	0.0	0.0	0.0
14	3.862721e-18	1.199914e-119	1.443415e-87	8.569816e-201	7.380322e-270	0.0	0.0	0.0	0.0
15	4.517673e-27	1.326285e-75	4.702998e-97	2.699069e-190	2.366159e-270	0.0	0.0	0.0	0.0
16	5.750846e-46	2.015897e-05	1.806253e-58	2.588474e-203	2.796677e-287	0.0	0.0	0.0	0.0
17	8.932809e-59	1.620352e-54	4.083566e-66	2.280885e-202	3.955781e-275	0.0	0.0	0.0	0.0
18	2.976866e-10	4.397820e-101	1.691598e-34	4.035965e-188	9.089320e-269	0.0	0.0	0.0	0.0
19	4.171920e-45	4.017150e-108	8.681977e-06	1.150085e-201	9.919236e-286	0.0	0.0	0.0	0.0

Cuadro 8: Wilkoxon Rank-Sum para SMS-EMOA-MOEAD

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	2.623451e-82	6.384444e-129	5.081800e-35	6.206150e-207	7.643950e-298	0.0	0.0	0.0	0.0
1	2.242579e-73	2.152015e-126	1.273920e-01	2.364836e-217	7.347218e-294	0.0	0.0	0.0	0.0
2	3.381427e-50	7.483337e-130	2.780094e-56	3.587014e-191	2.055236e-289	0.0	0.0	0.0	0.0
3	7.527713e-52	8.272975e-130	9.517687e-61	5.558084e-225	3.502173e-301	0.0	0.0	0.0	0.0
4	1.255583e-51	2.803644e-130	8.868291e-88	3.195808e-144	1.925759e-275	0.0	0.0	0.0	0.0
5	1.224709e-08	9.204955e-123	2.101604e-51	9.234137e-211	3.691169e-290	0.0	0.0	0.0	0.0
6	2.985948e-14	1.109063e-125	5.842969e-01	5.408009e-203	5.103429e-301	0.0	0.0	0.0	0.0
7	1.349428e-02	5.650134e-129	6.119890e-111	6.671798e-116	1.285944e-297	0.0	0.0	0.0	0.0
8	1.151455e-26	5.934531e-126	2.747354e-23	3.043327e-181	3.296584e-293	0.0	0.0	0.0	0.0
9	1.354977e-03	1.178304e-103	1.063603e-30	1.749168e-204	1.832619e-283	0.0	0.0	0.0	0.0
10	8.415177e-54	2.733380e-125	1.309189e-51	1.609482e-196	4.639266e-231	0.0	0.0	0.0	0.0
11	7.728186e-110	2.473584e-126	7.054142e-80	5.064647e-212	3.996035e-285	0.0	0.0	0.0	0.0
12	1.179703e-84	3.420088e-128	2.071059e-29	1.320392e-138	5.036858e-306	0.0	0.0	0.0	0.0
13	1.601021e-71	3.057387e-118	9.904591e-13	1.272628e-201	3.801808e-291	0.0	0.0	0.0	0.0
14	1.928985e-03	6.671172e-124	1.244180e-03	2.050728e-133	1.040435e-307	0.0	0.0	0.0	0.0
15	1.030078e-22	5.170539e-128	6.365314e-17	1.440730e-191	7.858384e-291	0.0	0.0	0.0	0.0
16	2.770468e-50	4.216886e-123	5.117412e-03	1.001061e-196	8.065738e-297	0.0	0.0	0.0	0.0
17	5.169606e-84	1.867454e-122	3.689487e-16	2.630044e-197	3.167497e-310	0.0	0.0	0.0	0.0
18	3.084137e-34	2.941360e-122	3.953414e-84	6.328758e-214	5.415647e-289	0.0	0.0	0.0	0.0
19	2.463957e-39	4.862951e-131	7.785930e-107	5.101903e-142	4.951059e-294	0.0	0.0	0.0	0.0

Cuadro 9: Wilkoxon Rank-Sum para SMS-EMOA-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	2.135768e-21	2.568065e-102	2.568065e-102	3.249898e-243	0.0	0.0	0.0	0.0	0.0
1	6.458160e-01	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
2	4.109867e-13	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
3	6.721345e-27	5.542729e-07	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
4	3.019219e-05	2.568065e-102	2.568065e-102	6.337245e-239	0.0	0.0	0.0	0.0	0.0
5	1.206387e-02	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
6	2.050222e-32	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
7	5.769551e-01	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
8	3.438232e-20	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
9	3.438232e-20	2.568065e-102	2.568065e-102	5.826291e-243	0.0	0.0	0.0	0.0	0.0
10	6.820946e-85	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
11	2.568065e-102	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
12	2.134634e-95	2.568065e-102	2.568065e-102	1.909101e-242	0.0	0.0	0.0	0.0	0.0
13	1.140145e-12	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
14	2.645609e-01	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
15	3.404385e-03	2.568065e-102	2.568065e-102	6.687014e-243	0.0	0.0	0.0	0.0	0.0
16	1.206387e-02	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
17	2.568065e-102	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
18	3.404385e-03	2.568065e-102	2.568065e-102	2.262918e-242	0.0	0.0	0.0	0.0	0.0
19	6.910616e-26	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0

Cuadro 10: Wilkoxon Rank-Sum para NSGA2-MOEAD

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	9.297651e-09	4.826781e-131	1.503523e-96	2.476672e-213	0.000000e+00	0.0	0.0	0.0	0.0
1	7.369213e-14	2.413060e-124	1.089918e-81	6.003908e-224	0.000000e+00	0.0	0.0	0.0	0.0
2	1.007673e-03	9.060429e-121	2.920132e-30	4.730440e-223	4.469132e-310	0.0	0.0	0.0	0.0
3	4.137557e-03	8.090604e-130	2.377586e-113	3.973962e-226	0.000000e+00	0.0	0.0	0.0	0.0
4	2.287083e-06	9.456681e-130	8.357286e-93	5.712466e-214	1.525552e-301	0.0	0.0	0.0	0.0
5	1.215863e-03	6.523007e-128	8.380099e-98	3.587659e-228	5.099853e-303	0.0	0.0	0.0	0.0
6	1.654259e-09	9.155431e-127	2.884197e-102	1.314238e-212	6.360534e-310	0.0	0.0	0.0	0.0
7	7.581748e-44	2.001573e-129	7.061484e-119	2.562207e-211	0.000000e+00	0.0	0.0	0.0	0.0
8	7.403128e-06	5.372848e-123	8.387825e-58	6.317065e-225	0.000000e+00	0.0	0.0	0.0	0.0
9	2.008270e-27	3.279714e-126	8.009440e-02	4.805869e-220	1.160913e-303	0.0	0.0	0.0	0.0
10	2.486929e-22	1.092577e-130	3.868109e-98	1.849109e-217	9.521442e-290	0.0	0.0	0.0	0.0
11	4.570491e-28	4.844832e-131	8.552142e-117	1.013309e-218	1.601418e-302	0.0	0.0	0.0	0.0
12	8.336746e-02	2.260888e-125	6.235469e-82	8.573491e-214	0.000000e+00	0.0	0.0	0.0	0.0
13	9.827162e-02	1.323338e-128	4.220986e-26	1.394458e-227	3.405687e-305	0.0	0.0	0.0	0.0
14	1.726201e-03	9.248263e-130	3.538004e-87	2.039011e-215	0.000000e+00	0.0	0.0	0.0	0.0
15	3.861180e-05	1.412183e-129	2.931340e-105	5.363893e-222	5.524550e-302	0.0	0.0	0.0	0.0
16	1.120619e-24	1.497487e-123	2.003475e-69	3.410253e-217	8.664274e-310	0.0	0.0	0.0	0.0
17	7.753762e-10	1.552867e-126	6.122004e-81	4.571201e-223	0.000000e+00	0.0	0.0	0.0	0.0
18	9.390223e-01	8.670764e-131	2.661270e-103	7.298386e-223	1.431213e-302	0.0	0.0	0.0	0.0
19	1.075095e-08	1.408026e-123	1.269557e-115	2.166631e-216	4.737615e-310	0.0	0.0	0.0	0.0

Cuadro 11: Wilkoxon Rank-Sum para NSGA2-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	3.459003e-15	2.568065e-102	2.568065e-102	3.249898e-243	0.0	0.0	0.0	0.0	0.0
1	3.014396e-26	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
2	1.848320e-14	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
3	1.636265e-22	1.751997e-06	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
4	2.367076e-11	2.568065e-102	2.568065e-102	8.840920e-241	0.0	0.0	0.0	0.0	0.0
5	3.711821e-01	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
6	1.614728e-03	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
7	6.721345e-27	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
8	4.704581e-09	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
9	1.453428e-13	2.568065e-102	2.568065e-102	5.572250e-243	0.0	0.0	0.0	0.0	0.0
10	2.252611e-35	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
11	1.888185e-31	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
12	3.289573e-01	2.568065e-102	2.568065e-102	8.596728e-243	0.0	0.0	0.0	0.0	0.0
13	5.310874e-18	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
14	3.153811e-28	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
15	5.042578e-14	2.568065e-102	2.568065e-102	5.243571e-243	0.0	0.0	0.0	0.0	0.0
16	1.326079e-25	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
17	1.005644e-23	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
18	5.042578e-14	2.568065e-102	2.568065e-102	6.579495e-243	0.0	0.0	0.0	0.0	0.0
19	1.973753e-18	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0

Cuadro 12: Wilkoxon Rank-Sum para MOEAD-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	2.329113e-43	2.568065e-102	2.568065e-102	3.249898e-243	0.0	0.0	0.0	0.0	0.0
1	5.964238e-56	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
2	7.096357e-41	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
3	1.597870e-42	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
4	7.292327e-59	2.568065e-102	2.568065e-102	2.121000e-242	0.0	0.0	0.0	0.0	0.0
5	1.894043e-49	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
6	4.593891e-40	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
7	1.856605e-73	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
8	3.014396e-26	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
9	6.422639e-46	2.568065e-102	2.568065e-102	4.719084e-243	0.0	0.0	0.0	0.0	0.0
10	3.329939e-44	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
11	6.249505e-78	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
12	6.502387e-57	2.568065e-102	2.568065e-102	5.921511e-243	0.0	0.0	0.0	0.0	0.0
13	3.842454e-33	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
14	1.816653e-38	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
15	2.322115e-72	2.568065e-102	2.568065e-102	4.111487e-243	0.0	0.0	0.0	0.0	0.0
16	4.593891e-40	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
17	3.427281e-70	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0
18	1.597870e-42	2.568065e-102	2.568065e-102	8.988500e-243	0.0	0.0	0.0	0.0	0.0
19	1.119764e-75	2.568065e-102	2.568065e-102	3.223648e-243	0.0	0.0	0.0	0.0	0.0

8. Scoring

Cuadro 13: Scoring de SMS-EMOA-NSGA2

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
2	-1.0	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
3	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
6	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
8	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
11	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
12	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
13	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
14	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
15	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
16	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
17	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
18	-1.0	1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
19	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

Cuadro 14: Scoring de SMS-EMOA-MOEAD

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	-1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
2	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	-1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 15: Scoring de SMS-EMOA-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 16: Scoring de NSGA2-MOEAD

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
10	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 17: Scoring de NSGA2-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 18: Scoring de MOEAD-SMSEMOA

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
10	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
15	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 19: Scores de SMS-EMOA por problema

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	-3.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	-2.0	-1.0	-2.0	1.0	1.0	1.0	1.0	1.0	1.0
2	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
5	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	-1.0	1.0	-2.0	1.0	1.0	1.0	1.0	1.0	1.0
7	0.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	-1.0	-1.0	-3.0	1.0	1.0	1.0	1.0	1.0	1.0
10	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
11	-3.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	-3.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
13	-3.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
14	-2.0	-1.0	-3.0	1.0	1.0	1.0	1.0	1.0	1.0
15	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
16	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
17	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
18	-1.0	1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0
19	-1.0	-1.0	-1.0	1.0	1.0	1.0	1.0	1.0	1.0

Cuadro 20: Scores de NSGA2 por problema

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
1	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
2	3.0	1.0	-1.0	3.0	3.0	3.0	3.0	3.0	3.0
3	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
4	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
5	2.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
6	3.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
7	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
8	3.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
9	3.0	1.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
10	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
11	3.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
12	1.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
13	2.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
14	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
15	3.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
16	3.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
17	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
18	2.0	-1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0
19	3.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0

Cuadro 21: Scores de MOEAD por problema

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1	1.0	-3.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
2	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
3	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
5	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
6	1.0	-3.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7	-1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
8	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
9	1.0	-3.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
11	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
12	2.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
13	2.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
14	1.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
15	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
16	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
17	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
18	2.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
19	1.0	-3.0	-3.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

Cuadro 22: Scores de SMSEMOA por problema

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	-1.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
1	-2.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
2	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
3	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
4	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
5	-2.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
6	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
7	-2.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
8	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
9	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
10	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
11	-1.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
12	0.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
13	-1.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
14	-2.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
15	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
16	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
17	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
18	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
19	-3.0	3.0	3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0

9. Ganadores

Cuadro 23: Standings por problema

	wfg1-k=3	wfg2-k=3	wfg3-k=3	wfg4-k=5	wfg4-k=6	wfg4-k=7	wfg4-k=8	wfg4-k=9	wfg4-k=10
0	NSGA2	SMSEMOA	SMSEMOA	NSGA2	NSGA2	NSGA2	NSGA2	NSGA2	NSGA2
1	MOEAD	NSGA2	NSGA2	SMS-EMOA	SMS-EMOA	SMS-EMOA	SMS-EMOA	SMS-EMOA	SMS-EMOA
2	SMS-EMOA	SMS-EMOA	SMS-EMOA	MOEAD	MOEAD	MOEAD	MOEAD	MOEAD	MOEAD
3	SMSEMOA	MOEAD	MOEAD	SMSEMOA	SMSEMOA	SMSEMOA	SMSEMOA	SMSEMOA	SMSEMOA

Cuadro 24: Conteo de Borda, Ganador: NSGA2

	1	2	3	4	Σ
SMS-EMOA	0	6	3	0	24
NSGA2	7	2	0	0	34
MOEAD	0	1	6	2	17
SMSEMOA	2	0	0	7	15

Cuadro 25: Ganador de Condorcet, Ganador: NSGA2

	SMS-EMOA	NSGA2	MOEAD	SMSEMOA
SMS-EMOA	-	0	8	7
NSGA2	9	-	9	7
MOEAD	2	0	-	7
SMSEMOA	2	0	0	-