



อักษรย่อ

อักษรย่อ	: คำอธิบาย
FMS	: การผลิตแบบยืดหยุ่น (Flexible Manufacturing System)
GA	: เจนเนติกอัลกอริทึม (Genetic Algorithm)
SGA	: เจนเนติกอัลกอริทึมอย่างง่าย (Simple Genetic Algorithm)
AOAs	: วิธีการหาคำตอบที่ดีที่สุดโดยอาศัยหลักการทางประมาณ (Approximation Optimization Algorithms)
COAs	: วิธีการหาคำตอบที่ดีที่สุดโดยอาศัยหลักการทางคณิตศาสตร์ (Conventional Optimization Algorithms)
COP	: การสลับสายพันธุ์ (Crossover Operation)
OX	: การสลับสายพันธุ์แบบออเดอร์ (Order Crossover)
PMX	: การสลับสายพันธุ์แบบพาร์เชียลแมป (Partially Mapped Crossover)
CX	: การสลับสายพันธุ์แบบไซคลิง (Cycling Crossover)
ERX	: การสลับสายพันธุ์แบบเอดจ์รีคอมบิเนชัน (Edge Recombination Crossover)
EERX	: การสลับสายพันธุ์แบบเอนฮานซ์เอดจ์รีคอมบิเนชัน (Enhanced Edge Recombination Crossover)
PBX	: การสลับสายพันธุ์แบบโพสิชันเบส (Position Based Crossover)
MPX	: การสลับสายพันธุ์แบบแมกซ์มีมัลพรีเซิร์ฟเวชัน (Maximal Preservation Crossover)
1PX	: การสลับสายพันธุ์แบบวันพอยท์ (One point Crossover)
2PCX	: การสลับสายพันธุ์แบบทูพอยท์เซนเตอร์ (Two Point Center Crossover)
2PEX	: การสลับสายพันธุ์แบบทูพอยท์เอนฮานซ์ (Two Point Enhanced Crossover)
LOX	: การสลับสายพันธุ์แบบลิเนียร์ออเดอร์ (Linear Order Crossover)

อักษรย่อ (ต่อ)

อักษรย่อ	: คำอธิบาย
AEX	: การสลับสายพันธุ์แบบอัลเตอร์เอดจ์เนตติ้ง (Alternating Edge Crossover)
SCX	: การสลับสายพันธุ์แบบซัพทัวร์ชังก์ (Sub Tour Chunk Crossover)
MOP	: การกลายพันธุ์ (Mutation Operation)
IM	: การกลายพันธุ์แบบอินเวอร์สชัน (Inverse Mutation)
SOM	: การกลายพันธุ์แบบชิฟท์โอเปอเรชัน (Shift Operation Mutation)
3OAS	: การกลายพันธุ์แบบทรีโอเปอเรชันส์แอดจาดเจนซ์สแควป (Three Operations Adjacent Swap Mutation)
3ORS	: การกลายพันธุ์แบบทรีโอเปอเรชันส์แอดจาดเจนซ์แรนดอมสแควป (Three Operations Adjacent Random Swap Mutation)
2OAS	: การกลายพันธุ์แบบทูโอเปอเรชันส์แอดจาดเจนซ์สแควป (Two Operations Adjacent Swap Mutation)
2ORS	: การกลายพันธุ์แบบทูโอเปอเรชันส์แอดจาดเจนซ์แรนดอมสแควป (Two Operations Adjacent Random Swap Mutation)
CIM	: การกลายพันธุ์แบบเซ็นเตอร์อินเวอร์ส (Center Inverse Mutation)
E2ORS	: การกลายพันธุ์แบบเอนฮานซ์ทูโอเปอเรชันส์แรนดอมสแควป (Enhanced Two Operation Swap Mutation)
GAMLP	: โปรแกรมสำหรับแก้ปัญหาการจัดเรียงเครื่องจักรในระบบการผลิตแบบยืดหยุ่น (Genetic Algorithm for Modeling Layout Problem Program)
AGV	: รถที่ถูกบังคับให้เคลื่อนที่ไปตามทิศทางที่กำหนดให้โดยอัตโนมัติ (Automated Guided Vehicle)



ตารางที่ ข.1 แสดงผลการทดลองการแก้ปัญหา 10 เครื่องจักร 3 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	193.475	191.225	193.575	187.575	204.225	187.575	204.225	6.205	194.015
1PX	E2ORS	25/100	203.675	207.125	191.225	200.125	193.475	191.225	207.125	6.709	200.125
1PX	2OAS	25/100	187.575	202.875	201.325	200.125	197.725	187.575	202.875	6.084	200.125
1PX	2ORS	25/100	199.875	191.975	191.825	193.475	197.725	191.825	199.875	3.631	193.475
1PX	SOM	25/100	201.925	201.925	200.625	193.575	187.575	187.575	201.925	6.367	200.625
1PX	3OAS	25/100	194.725	193.475	187.575	189.375	189.375	187.575	194.725	3.040	189.375
1PX	3ORS	25/100	208.525	207.125	201.925	202.325	197.725	197.725	208.525	4.347	202.325
1PX	IM	25/100	201.925	201.925	200.625	193.575	187.575	187.575	201.925	6.367	200.625
2PEX	CIM	25/100	199.775	193.975	193.775	194.725	208.525	193.775	208.525	6.296	194.725
2PEX	E2ORS	25/100	199.775	190.975	190.975	200.125	203.525	190.975	203.525	5.758	199.775
2PEX	2OAS	25/100	199.775	190.975	190.975	203.525	203.525	190.975	203.525	6.376	199.775
2PEX	2ORS	25/100	186.975	189.775	190.975	196.875	194.725	186.975	196.875	3.948	190.975
2PEX	SOM	25/100	186.975	190.975	190.975	200.125	203.525	186.975	203.525	6.974	190.975
2PEX	3OAS	25/100	197.375	201.375	190.975	203.525	187.575	187.575	203.525	6.773	197.375
2PEX	3ORS	25/100	199.775	196.975	190.975	194.725	194.725	190.975	199.775	3.244	194.725
2PEX	IM	25/100	186.975	190.975	190.975	200.125	203.525	186.975	203.525	6.974	190.975
2PCX	CIM	25/100	192.275	197.775	187.575	197.875	190.475	187.575	197.875	4.547	193.195
2PCX	E2ORS	25/100	202.525	190.975	187.575	189.375	192.175	187.575	202.525	5.851	192.525
2PCX	2OAS	25/100	191.325	186.975	194.725	187.675	189.375	186.975	194.725	3.124	190.015
2PCX	2ORS	25/100	186.975	187.575	191.825	193.475	190.375	186.975	193.475	2.764	190.045
2PCX	SOM	25/100	187.575	190.375	204.225	190.375	187.575	187.575	204.225	6.962	192.025
2PCX	3OAS	25/100	186.975	189.375	187.575	193.475	187.575	186.975	193.475	2.661	188.995
2PCX	3ORS	25/100	187.575	202.875	188.775	187.575	187.675	187.575	202.875	6.716	190.895
2PCX	IM	25/100	187.575	190.375	204.225	190.375	187.575	187.575	204.225	6.962	192.025

ตารางที่ ข.1 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 10 เครื่องจักร 3 ผลผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
MPX	CIM	25/100	194.725	202.725	191.975	193.575	204.825	191.975	204.825	5.800	197.565
MPX	E2ORS	25/100	199.575	202.525	193.475	204.325	193.775	193.475	204.325	4.965	198.735
MPX	2OAS	25/100	191.825	196.225	187.575	197.575	191.975	187.575	197.575	3.975	193.035
MPX	2ORS	25/100	190.975	189.375	193.625	189.875	195.325	189.375	195.325	2.550	191.835
MPX	SOM	25/100	187.575	202.875	187.575	201.275	190.375	187.575	202.875	7.539	193.935
MPX	3OAS	25/100	187.575	187.675	187.575	207.675	187.575	187.575	207.675	8.978	191.615
MPX	3ORS	25/100	187.575	187.575	193.475	184.575	191.825	184.575	193.475	3.593	189.005
MPX	IM	25/100	195.225	200.625	192.775	194.725	199.075	192.775	200.625	3.252	196.485
LOX	CIM	25/100	198.475	194.725	187.575	197.675	202.525	187.575	202.525	5.566	196.195
LOX	E2ORS	25/100	187.675	186.975	193.625	190.375	199.225	186.975	199.225	5.013	191.575
LOX	2OAS	25/100	193.375	209.025	208.805	193.475	201.725	193.375	209.025	7.749	201.281
LOX	2ORS	25/100	194.125	193.375	189.475	206.275	197.675	189.475	206.275	6.348	196.185
LOX	SOM	25/100	187.575	191.225	194.625	200.125	207.075	187.575	207.075	7.669	196.125
LOX	3OAS	25/100	194.125	190.375	187.675	197.725	199.075	187.675	199.075	4.811	193.795
LOX	3ORS	25/100	197.625	206.125	196.525	191.975	200.025	191.975	206.125	5.189	198.455
LOX	IM	25/100	194.475	192.175	187.175	187.575	198.125	187.175	198.125	4.650	191.905
EERX	CIM	25/100	235.375	222.725	210.425	224.425	226.825	210.425	235.375	8.992	223.955
EERX	E2ORS	25/100	223.275	230.525	204.075	239.225	233.425	204.075	239.225	13.588	226.105
EERX	2OAS	25/100	222.475	230.525	219.575	238.925	217.725	217.725	238.925	8.798	225.845
EERX	2ORS	25/100	218.225	206.725	204.075	217.925	215.325	204.075	218.225	6.605	212.455
EERX	SOM	25/100	213.175	226.125	203.825	220.525	216.625	203.825	226.125	8.360	216.055
EERX	3OAS	25/100	212.225	226.125	203.825	220.525	216.625	203.825	226.125	8.452	215.865
EERX	3ORS	25/100	220.075	228.325	211.075	220.525	229.275	211.075	229.275	7.383	221.855
EERX	IM	25/100	222.475	206.725	204.075	217.925	217.725	204.075	222.475	7.942	213.785

ตารางที่ ข.1 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 10 เครื่องจักร 3 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
PBX	CIM	25/100	206.375	192.975	187.575	187.575	201.825	187.575	206.375	8.514	195.265
PBX	E2ORS	25/100	200.575	191.925	193.475	196.525	180.075	180.075	200.575	7.698	192.515
PBX	2OAS	25/100	203.775	191.825	187.575	187.675	186.975	186.975	203.775	7.094	191.565
PBX	2ORS	25/100	191.825	191.825	193.475	200.125	187.675	187.675	200.125	4.531	192.985
PBX	SOM	25/100	193.475	200.625	187.575	187.675	199.725	187.575	200.625	6.286	193.815
PBX	3OAS	25/100	193.575	189.375	186.975	187.575	186.975	186.975	193.575	2.795	188.895
PBX	3ORS	25/100	202.525	190.975	187.575	204.175	186.975	186.975	204.175	8.292	194.445
PBX	IM	25/100	187.575	190.975	193.475	186.975	187.575	186.975	193.475	2.810	189.315
ERX	CIM	25/100	235.375	222.725	210.425	224.425	226.825	210.425	235.375	8.992	223.955
ERX	E2ORS	25/100	223.275	230.525	204.075	239.225	233.425	204.075	239.225	13.588	226.105
ERX	2OAS	25/100	222.475	230.525	219.575	238.925	217.725	217.725	238.925	8.798	225.845
ERX	2ORS	25/100	218.225	206.725	204.075	217.925	215.325	204.075	218.225	6.605	212.455
ERX	SOM	25/100	213.175	226.125	203.825	220.525	216.625	203.825	226.125	8.360	216.055
ERX	3OAS	25/100	212.225	204.725	205.825	203.175	208.625	203.175	212.225	3.574	206.915
ERX	3ORS	25/100	220.075	228.325	211.075	220.525	229.275	211.075	229.275	7.383	221.855
ERX	IM	25/100	222.475	206.725	204.075	217.925	217.725	204.075	222.475	7.942	213.785
CX	CIM	25/100	208.575	194.125	201.025	198.675	210.475	194.125	210.475	6.845	202.575
CX	E2ORS	25/100	208.525	197.025	206.725	216.025	199.575	197.025	216.025	7.555	205.575
CX	2OAS	25/100	210.975	194.625	213.625	210.125	203.525	194.625	213.625	7.645	206.575
CX	2ORS	25/100	197.725	198.025	196.525	206.825	209.325	196.525	209.325	5.926	201.685
CX	SOM	25/100	196.525	196.825	196.175	203.225	187.075	187.075	203.225	5.763	195.965
CX	3OAS	25/100	200.425	194.625	187.575	194.725	200.625	187.575	200.625	5.354	195.595
CX	3ORS	25/100	193.475	203.175	204.075	210.625	208.225	193.475	210.625	6.580	203.915
CX	IM	25/100	219.075	210.825	196.475	201.925	193.775	193.775	219.075	10.470	204.415

ตารางที่ ข.1 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 10 เครื่องจักร 3 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
PMX	CIM	25/100	195.925	187.575	193.575	189.475	187.575	187.575	195.925	3.759	190.825
PMX	E2ORS	25/100	189.475	187.575	187.575	190.975	196.775	187.575	196.775	3.800	190.475
PMX	2OAS	25/100	191.975	187.575	187.675	196.825	193.475	187.575	196.825	3.953	191.505
PMX	2ORS	25/100	191.225	193.475	187.575	193.475	198.725	187.575	198.725	4.054	192.895
PMX	SOM	25/100	186.975	187.575	189.775	187.575	187.575	186.975	189.775	1.083	187.895
PMX	3OAS	25/100	186.975	187.675	193.575	187.675	187.675	186.975	193.575	2.734	188.715
PMX	3ORS	25/100	187.575	197.525	189.375	194.075	193.575	187.575	197.525	3.965	192.425
PMX	IM	25/100	198.175	194.775	193.575	194.975	193.625	193.575	198.175	1.874	195.025
AEX	CIM	25/100	199.325	198.975	197.425	197.375	187.075	187.075	199.325	5.086	196.035
AEX	E2ORS	25/100	196.875	197.625	208.025	202.575	195.375	195.375	208.025	5.191	200.095
AEX	2OAS	25/100	198.975	204.725	203.825	202.575	195.775	195.775	204.725	3.728	201.175
AEX	2ORS	25/100	202.575	199.275	200.575	207.225	202.525	199.275	207.225	3.017	202.435
AEX	SOM	25/100	210.825	200.675	200.225	196.475	197.525	196.475	210.825	5.694	201.145
AEX	3OAS	25/100	208.875	194.975	197.475	203.325	198.975	194.975	208.875	5.474	200.725
AEX	3ORS	25/100	191.825	196.975	199.675	206.475	195.375	191.825	206.475	5.493	198.065
AEX	IM	25/100	194.075	193.575	203.125	201.225	201.775	193.575	203.125	4.557	198.755
SCX	CIM	25/100	193.775	194.125	189.475	186.975	190.375	186.975	194.125	3.015	190.945
SCX	E2ORS	25/100	202.175	194.075	200.675	200.025	187.075	187.075	202.175	6.251	196.805
SCX	2OAS	25/100	202.175	200.675	198.725	198.025	200.675	198.025	202.175	1.670	200.055
SCX	2ORS	25/100	196.425	198.225	189.375	203.425	190.375	189.375	203.425	5.806	195.565
SCX	SOM	25/100	187.575	186.975	189.475	193.575	191.226	186.975	193.575	2.707	189.765
SCX	3OAS	25/100	197.275	190.375	189.375	189.375	187.675	187.675	197.275	3.739	190.815
SCX	3ORS	25/100	197.375	190.375	189.375	189.375	187.675	187.675	197.375	3.783	190.835
SCX	IM	25/100	191.825	199.125	194.725	191.225	193.575	191.225	199.125	3.137	194.095

ตารางที่ ข.1 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 10 เครื่องจักร 3 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
OX	CIM	25/100	188.775	187.575	189.375	194.775	197.75	187.575	197.75	4.388	191.650
OX	E2ORS	25/100	191.825	199.425	196.925	187.575	192.775	187.575	199.425	4.611	193.705
OX	2OAS	25/100	200.025	202.375	190.475	187.675	196.475	187.675	202.375	6.228	195.405
OX	2ORS	25/100	186.975	200.575	187.575	197.725	193.575	186.975	200.575	6.028	193.285
OX	SOM	25/100	194.625	194.775	196.175	193.475	186.975	186.975	196.175	3.612	193.205
OX	3OAS	25/100	197.525	187.575	187.575	193.475	204.925	187.575	204.925	7.321	194.215
OX	3ORS	25/100	191.225	195.925	187.575	189.375	193.625	187.575	195.925	3.320	191.545
OX	IM	25/100	191.825	190.475	196.175	191.975	213.525	190.475	213.525	9.594	196.795

ตารางที่ ข.2 แสดงผลการทดลองการแก้ปัญหา 20 เครื่องจักร 5 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	1330.750	1215.850	1196.850	1134.750	1013.550	1013.550	1330.750	116.226	1178.350
1PX	E2ORS	25/100	1157.150	1177.150	1250.400	1167.450	1293.700	1157.150	1293.700	59.827	1209.170
1PX	2OAS	25/100	1237.550	1316.600	1303.900	1364.100	1389.450	1237.550	1389.450	58.758	1322.320
1PX	2ORS	25/100	1074.400	1072.850	1134.850	1278.650	1166.650	1072.850	1278.650	84.592	1145.480
1PX	SOM	25/100	1122.300	1146.850	1210.900	1426.150	1361.050	1122.300	1426.150	133.957	1253.450
1PX	3OAS	25/100	1075.300	1160.300	1199.450	1314.050	1287.000	1075.300	1314.050	86.750	1207.220
1PX	3ORS	25/100	1201.850	1242.300	1277.700	1271.300	1416.000	1201.850	1416.000	80.760	1281.830
1PX	IM	25/100	1025.000	1255.500	1171.600	1379.200	1386.200	1025.000	1386.200	151.520	1243.500
2PEX	CIM	25/100	1305.650	1267.450	1353.600	1090.950	1385.700	1090.950	1385.700	115.263	1280.670
2PEX	E2ORS	25/100	1358.300	1215.600	1366.100	1350.250	1368.100	1215.600	1368.100	65.267	1331.670
2PEX	2OAS	25/100	1424.000	1286.200	1330.350	1357.850	1378.500	1286.200	1424.000	51.628	1355.360
2PEX	2ORS	25/100	1434.100	1143.350	1356.800	1337.700	1417.050	1143.350	1434.100	115.894	1337.800
2PEX	SOM	25/100	1337.750	1308.750	1357.950	1215.300	1207.450	1207.450	1357.950	69.892	1285.440
2PEX	3OAS	25/100	1133.050	1230.500	1382.600	1215.650	1207.450	1133.050	1382.600	91.278	1233.850
2PEX	3ORS	25/100	1372.400	1414.700	1324.050	1329.550	1325.950	1324.050	1414.700	39.694	1353.330
2PEX	IM	25/100	1426.650	1252.800	1346.650	1222.050	1384.000	1222.050	1426.650	86.723	1326.430

ตารางที่ ข.2 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 20 เครื่องจักร 5 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
2PCX	CIM	25/100	1195.350	1305.600	1324.850	1002.400	1462.500	1002.400	1462.500	171.618	1258.140
2PCX	E2ORS	25/100	1315.500	1340.450	1450.650	1250.900	1421.450	1250.900	1450.650	80.886	1355.790
2PCX	2OAS	25/100	1321.300	1288.550	1530.650	1296.350	1474.050	1288.550	1530.650	112.164	1382.180
2PCX	2ORS	25/100	1295.600	1192.000	1365.650	1287.950	1416.050	1192.000	1416.050	85.074	1311.450
2PCX	SOM	25/100	1336.650	1244.550	1344.000	1099.050	1188.650	1099.050	1344.000	103.257	1242.580
2PCX	3OAS	25/100	1132.400	1405.300	1382.750	1335.900	1323.500	1132.400	1405.300	107.925	1315.970
2PCX	3ORS	25/100	1209.050	1253.950	1399.250	1308.050	1336.600	1209.050	1399.250	73.549	1301.380
2PCX	IM	25/100	1193.400	1388.750	1312.050	1138.400	1397.200	1138.400	1397.200	116.149	1285.960
MPX	CIM	25/100	1128.800	1297.000	1262.300	1023.600	1393.600	1023.600	1393.600	145.551	1221.060
MPX	E2ORS	25/100	1340.500	1301.850	1447.600	1332.550	1399.500	1301.850	1447.600	58.422	1364.400
MPX	2OAS	25/100	1356.650	1256.850	1426.800	1332.250	1411.700	1256.850	1426.800	68.020	1356.850
MPX	2ORS	25/100	1364.950	1273.460	1320.850	1394.400	1415.500	1273.460	1415.500	57.271	1353.832
MPX	SOM	25/100	1337.350	1311.800	1308.500	1431.450	1400.900	1308.500	1431.450	55.332	1358.000
MPX	3OAS	25/100	1320.750	1278.950	1399.750	1327.800	1117.700	1117.700	1399.750	105.147	1288.990
MPX	3ORS	25/100	1276.050	1281.400	1365.200	1294.750	1450.500	1276.050	1450.500	74.516	1333.580
MPX	IM	25/100	1213.000	1340.550	1285.200	1408.250	1443.450	1213.000	1443.450	92.836	1338.090
LOX	CIM	25/100	1172.850	1160.000	1230.200	1169.050	1076.550	1076.550	1230.200	55.055	1161.730
LOX	E2ORS	25/100	1358.750	1338.550	1378.000	1388.900	1373.550	1338.550	1388.900	19.490	1367.550
LOX	2OAS	25/100	1417.700	1495.450	1384.900	1473.350	1169.700	1169.700	1495.450	129.785	1388.220
LOX	2ORS	25/100	1168.650	1401.650	1382.150	1321.600	1357.450	1168.650	1401.650	93.063	1326.300
LOX	SOM	25/100	1366.500	1296.800	1373.600	1417.250	1294.050	1294.050	1417.250	53.178	1349.640
LOX	3OAS	25/100	1246.650	1434.800	1240.750	1329.250	1340.800	1240.750	1434.800	79.602	1318.450
LOX	3ORS	25/100	1340.900	1328.650	1289.700	1376.600	1341.050	1289.700	1376.600	31.200	1335.380
LOX	IM	25/100	1228.500	1337.900	1377.500	1372.300	1125.300	1125.300	1377.500	109.108	1288.300
EERX	CIM	25/100	1290.500	1046.750	1225.950	1168.650	1387.800	1046.750	1387.800	128.197	1223.930
EERX	E2ORS	25/100	1329.400	1238.050	1436.100	1271.700	1284.050	1238.050	1436.100	76.775	1311.860
EERX	2OAS	25/100	1387.150	1192.800	1637.800	1343.500	1402.750	1192.800	1637.800	160.146	1392.800
EERX	2ORS	25/100	1282.400	1162.650	1454.950	1321.300	1281.650	1162.650	1454.950	104.849	1300.590
EERX	SOM	25/100	1286.750	1206.000	1540.550	1262.400	1294.800	1206.000	1540.550	129.111	1318.100
EERX	3OAS	25/100	1327.650	1290.900	1406.150	1318.050	1323.600	1290.900	1406.150	43.196	1333.270
EERX	3ORS	25/100	1318.100	1188.350	1592.400	1269.900	1402.750	1188.350	1592.400	154.120	1354.300
EERX	IM	25/100	1334.000	1348.850	1480.150	1262.400	1214.300	1214.300	1480.150	101.059	1327.940

ตารางที่ ข.2 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 20 เครื่องจักร 5 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
EERX	CIM	25/100	1290.500	1046.750	1225.950	1168.650	1387.800	1046.750	1387.800	128.197	1223.930
EERX	E2ORS	25/100	1329.400	1238.050	1436.100	1271.700	1284.050	1238.050	1436.100	76.775	1311.860
EERX	2OAS	25/100	1387.150	1192.800	1637.800	1343.500	1402.750	1192.800	1637.800	160.146	1392.800
EERX	2ORS	25/100	1282.400	1162.650	1454.950	1321.300	1281.650	1162.650	1454.950	104.849	1300.590
EERX	SOM	25/100	1286.750	1206.000	1540.550	1262.400	1294.800	1206.000	1540.550	129.111	1318.100
EERX	3OAS	25/100	1327.650	1290.900	1406.150	1318.050	1323.600	1290.900	1406.150	43.196	1333.270
EERX	3ORS	25/100	1318.100	1188.350	1592.400	1269.900	1402.750	1188.350	1592.400	154.120	1354.300
EERX	IM	25/100	1334.000	1348.850	1480.150	1262.400	1214.300	1214.300	1480.150	101.059	1327.940
PBX	CIM	25/100	1212.400	1341.250	1348.650	1365.850	1204.950	1204.950	1365.850	79.007	1294.620
PBX	E2ORS	25/100	1290.300	1349.150	1373.650	1377.550	1357.050	1290.300	1377.550	35.113	1349.540
PBX	2OAS	25/100	1327.400	1487.500	1405.450	1304.000	1384.750	1304.000	1487.500	72.029	1381.820
PBX	2ORS	25/100	1319.050	1354.000	1165.950	1351.750	1303.150	1165.950	1354.000	77.345	1298.780
PBX	SOM	25/100	1068.300	1391.600	1298.500	1368.400	1288.550	1068.300	1391.600	127.920	1283.070
PBX	3OAS	25/100	1311.750	1416.000	1169.000	1289.250	1174.800	1169.000	1416.000	103.284	1272.160
PBX	3ORS	25/100	1278.850	1344.750	1368.700	1359.450	1359.450	1278.850	1368.700	36.459	1342.240
PBX	IM	25/100	1212.450	1283.650	1267.050	1285.700	1343.750	1212.450	1343.750	46.983	1278.520
ERX	CIM	25/100	1290.500	1046.750	1225.950	1168.650	1387.800	1046.750	1387.800	128.197	1223.930
ERX	E2ORS	25/100	1329.400	1238.050	1436.100	1271.700	1284.050	1238.050	1436.100	76.775	1311.860
ERX	2OAS	25/100	1387.150	1192.800	1637.800	1343.500	1402.750	1192.800	1637.800	160.146	1392.800
ERX	2ORS	25/100	1282.400	1162.650	1454.950	1321.300	1281.650	1162.650	1454.950	104.849	1300.590
ERX	SOM	25/100	1286.750	1391.600	1540.550	1280.350	1294.800	1280.350	1540.550	111.300	1358.810
ERX	3OAS	25/100	1327.650	1290.900	1406.150	1318.050	1323.600	1290.900	1406.150	43.196	1333.270
ERX	3ORS	25/100	1318.100	1188.350	1592.400	1269.900	1402.750	1188.350	1592.400	154.120	1354.300
ERX	IM	25/100	1334.000	1348.850	1480.150	1262.400	1214.300	1214.300	1480.150	101.059	1327.940
CX	CIM	25/100	1303.900	1268.150	1356.350	1450.150	1013.350	1013.350	1450.150	163.234	1278.380
CX	E2ORS	25/100	1415.350	1388.900	1158.550	1219.350	1418.300	1158.550	1418.300	122.166	1320.090
CX	2OAS	25/100	1451.750	1388.500	1260.300	1410.200	1360.100	1260.300	1451.750	71.914	1374.170
CX	2ORS	25/100	1427.950	1420.500	1250.300	1369.150	1393.650	1250.300	1427.950	72.059	1372.310
CX	SOM	25/100	1213.050	1349.500	1206.150	1317.850	1382.700	1206.150	1382.700	80.292	1293.850
CX	3OAS	25/100	1347.000	1294.850	1245.950	1416.050	1453.950	1245.950	1453.950	85.195	1351.560
CX	3ORS	25/100	1362.800	1404.950	1256.150	1392.350	1437.450	1256.150	1437.450	69.429	1370.740
CX	IM	25/100	1365.150	1336.450	1390.450	1227.250	1261.150	1227.250	1390.450	69.393	1316.090

ตารางที่ ข.2 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 20 เครื่องจักร 5 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
PMX	CIM	25/100	1104.000	1320.050	1322.600	1337.400	1229.750	1104.000	1337.400	98.398	1262.760
PMX	E2ORS	25/100	1276.750	1391.050	1362.850	1341.200	1436.350	1276.750	1436.350	59.313	1361.640
PMX	2OAS	25/100	1371.250	1434.100	1356.250	1201.650	1327.500	1201.650	1434.100	85.696	1338.150
PMX	2ORS	25/100	1271.550	1405.700	1422.100	1181.450	1343.800	1181.450	1422.100	99.697	1324.920
PMX	SOM	25/100	1348.850	1311.200	1392.250	1253.200	1384.900	1253.200	1392.250	57.380	1338.080
PMX	3OAS	25/100	1226.000	1191.000	1401.750	1272.750	1271.400	1191.000	1401.750	79.861	1272.580
PMX	3ORS	25/100	1303.200	1386.650	1339.350	1251.350	1347.250	1251.350	1386.650	50.989	1325.560
PMX	IM	25/100	1094.650	1437.650	1345.550	1277.950	1332.300	1094.650	1437.650	127.173	1297.620
AEX	CIM	25/100	1417.150	1327.950	1296.850	1175.750	1033.500	1033.500	1417.150	148.825	1250.240
AEX	E2ORS	25/100	1209.300	1212.250	1247.650	1470.500	1355.950	1209.300	1470.500	112.765	1247.650
AEX	2OAS	25/100	1347.250	1151.550	1212.050	1347.550	1289.150	1151.550	1347.550	86.220	1289.150
AEX	2ORS	25/100	1413.200	1312.400	1127.250	1405.900	1350.450	1127.250	1413.200	116.389	1350.450
AEX	SOM	25/100	1365.900	1199.050	1299.250	1185.450	1249.450	1185.450	1365.900	74.396	1249.450
AEX	3OAS	25/100	1234.850	1196.250	1372.800	1371.250	1448.100	1196.250	1448.100	105.215	1371.250
AEX	3ORS	25/100	1441.250	1128.750	1283.400	1416.000	1401.550	1128.750	1441.250	129.882	1401.550
AEX	IM	25/100	1104.000	1286.400	1295.650	1232.200	1292.500	1104.000	1295.650	81.455	1286.400
SCX	CIM	25/100	1403.600	1101.850	1258.450	1196.300	1088.050	1088.050	1403.600	129.019	1196.300
SCX	E2ORS	25/100	1386.250	1308.850	1039.650	1209.800	1285.800	1039.650	1386.250	131.430	1285.800
SCX	2OAS	25/100	1449.400	1345.100	1279.300	1184.650	1295.800	1184.650	1449.400	96.847	1295.800
SCX	2ORS	25/100	1274.550	1339.900	1171.500	1267.400	1307.650	1171.500	1339.900	63.263	1274.550
SCX	SOM	25/100	1458.250	1384.850	1279.850	1227.200	1325.050	1227.200	1458.250	90.051	1325.050
SCX	3OAS	25/100	1285.100	1403.950	1209.700	1062.050	1272.400	1062.050	1403.950	124.827	1272.400
SCX	3ORS	25/100	1357.550	1398.850	1227.100	1231.300	1282.800	1227.100	1398.850	76.505	1282.800
SCX	IM	25/100	1329.800	1185.250	1171.850	1178.700	1309.100	1171.850	1329.800	77.638	1185.250
OX	CIM	25/100	1250.500	1231.800	1118.650	1264.500	1165.000	1118.650	1264.500	62.006	1231.800
OX	E2ORS	25/100	1114.300	1465.000	1340.750	1381.300	1455.450	1114.300	1465.000	142.263	1381.300
OX	2OAS	25/100	1418.500	1399.000	1341.450	1429.950	1396.400	1341.450	1429.950	34.052	1399.000
OX	2ORS	25/100	1131.300	1430.950	1335.400	1231.750	1399.450	1131.300	1430.950	123.736	1335.400
OX	SOM	25/100	1321.300	1336.600	1341.250	1434.250	1449.900	1321.300	1449.900	60.424	1341.250
OX	3OAS	25/100	1377.200	1221.100	1134.300	1298.850	1269.950	1134.300	1377.200	90.357	1269.950
OX	3ORS	25/100	1286.350	1373.400	1318.150	1267.300	1381.350	1267.300	1381.350	50.959	1318.150
OX	IM	25/100	1356.650	1393.250	1382.050	1411.650	1236.350	1236.350	1411.650	69.785	1382.050

ตารางที่ ข.3 แสดงผลการทดลองการแก้ปัญหา 25 เครื่องจักร 9 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	1463.150	1478.550	1454.230	1454.750	1449.550	1449.550	1478.550	11.446	1460.046
1PX	E2ORS	25/100	1437.050	1378.850	1401.050	1480.750	1482.650	1378.850	1482.650	46.550	1436.070
1PX	2OAS	25/100	1390.850	1442.350	1481.250	1478.650	1472.550	1390.850	1481.250	38.125	1453.130
1PX	2ORS	25/100	1481.850	1451.450	1442.550	1504.650	1488.350	1442.550	1504.650	26.001	1473.770
1PX	SOM	25/100	1493.850	1351.450	1482.250	1469.550	1492.250	1351.450	1493.850	60.276	1457.870
1PX	3OAS	25/100	1453.050	1405.650	1430.950	1463.850	1493.250	1405.650	1493.250	33.164	1449.350
1PX	3ORS	25/100	1526.550	1468.150	1505.950	1460.650	1474.250	1460.650	1526.550	27.998	1487.110
1PX	IM	25/100	1493.850	1351.150	1482.250	1469.550	1492.250	1351.150	1493.850	60.408	1457.810
2PEX	CIM	25/100	1463.650	1360.150	1472.650	1396.950	1482.450	1360.150	1482.450	53.712	1435.170
2PEX	E2ORS	25/100	1437.250	1360.150	1472.650	1369.950	1482.450	1360.150	1482.450	56.912	1424.490
2PEX	2OAS	25/100	1459.450	1350.850	1468.950	1422.550	1514.550	1350.850	1514.550	61.182	1443.270
2PEX	2ORS	25/100	1418.850	1405.050	1449.050	1435.250	1510.150	1405.050	1510.150	40.703	1443.670
2PEX	SOM	25/100	1396.350	1407.350	1460.650	1435.250	1483.350	1396.350	1483.350	36.199	1436.590
2PEX	3OAS	25/100	1407.750	1440.450	1422.250	1464.950	1509.250	1407.750	1509.250	39.921	1448.930
2PEX	3ORS	25/100	1455.550	1442.350	1395.850	1448.650	1535.850	1395.850	1535.850	50.582	1455.650
2PEX	IM	25/100	1396.350	1407.350	1460.650	1435.250	1483.350	1396.350	1483.350	36.199	1436.590
2PCX	CIM	25/100	1439.450	1451.450	1447.350	1369.650	1443.250	1369.650	1451.450	34.161	1430.230
2PCX	E2ORS	25/100	1384.950	1417.450	1425.750	1447.350	1490.050	1384.950	1490.050	38.935	1433.110
2PCX	2OAS	25/100	1464.150	1458.850	1458.550	1459.650	1437.650	1437.650	1464.150	10.378	1455.770
2PCX	2ORS	25/100	1426.350	1427.350	1423.750	1472.950	1505.550	1423.750	1505.550	36.629	1451.190
2PCX	SOM	25/100	1489.550	1431.550	1421.250	1466.350	1495.950	1421.250	1495.950	33.588	1460.930
2PCX	3OAS	25/100	1517.850	1394.650	1432.950	1425.250	1493.750	1394.650	1517.850	51.095	1452.890
2PCX	3ORS	25/100	1364.350	1407.950	1432.950	1468.050	1498.650	1364.350	1498.650	52.127	1434.390
2PCX	IM	25/100	1389.750	1461.450	1391.550	1436.450	1433.150	1389.750	1461.450	31.047	1422.470
MPX	CIM	25/100	1436.650	1467.550	1413.750	1495.250	1465.750	1413.750	1495.250	31.338	1455.790
MPX	E2ORS	25/100	1404.450	1438.550	1435.450	1438.150	1431.125	1404.450	1438.550	14.338	1429.545
MPX	2OAS	25/100	1468.450	1425.750	1505.450	1468.550	1435.950	1425.750	1505.450	31.457	1460.830
MPX	2ORS	25/100	1400.650	1456.150	1406.850	1454.750	1404.950	1400.650	1456.150	28.192	1424.670
MPX	SOM	25/100	1469.850	1442.350	1420.950	1527.050	1498.050	1420.950	1527.050	42.422	1471.650
MPX	3OAS	25/100	1473.350	1422.850	1389.750	1441.150	1468.450	1389.750	1473.350	34.417	1439.110
MPX	3ORS	25/100	1456.750	1425.450	1465.450	1501.350	1434.250	1425.450	1501.350	29.794	1456.650
MPX	IM	25/100	1462.150	1465.350	1430.550	1503.950	1478.550	1430.550	1503.950	26.680	1468.110

ตารางที่ ข.3 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 25 เครื่องจักร 9 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	1463.150	1478.550	1454.230	1454.750	1449.550	1449.550	1478.550	11.446	1460.046
1PX	E2ORS	25/100	1437.050	1378.850	1401.050	1480.750	1482.650	1378.850	1482.650	46.550	1436.070
1PX	2OAS	25/100	1390.850	1442.350	1481.250	1478.650	1472.550	1390.850	1481.250	38.125	1453.130
1PX	2ORS	25/100	1481.850	1451.450	1442.550	1504.650	1488.350	1442.550	1504.650	26.001	1473.770
1PX	SOM	25/100	1493.850	1351.450	1482.250	1469.550	1492.250	1351.450	1493.850	60.276	1457.870
1PX	3OAS	25/100	1453.050	1405.650	1430.950	1463.850	1493.250	1405.650	1493.250	33.164	1449.350
1PX	3ORS	25/100	1526.550	1468.150	1505.950	1460.650	1474.250	1460.650	1526.550	27.998	1487.110
1PX	IM	25/100	1493.850	1351.150	1482.250	1469.550	1492.250	1351.150	1493.850	60.408	1457.810
2PEX	CIM	25/100	1463.650	1360.150	1472.650	1396.950	1482.450	1360.150	1482.450	53.712	1435.170
2PEX	E2ORS	25/100	1437.250	1360.150	1472.650	1369.950	1482.450	1360.150	1482.450	56.912	1424.490
2PEX	2OAS	25/100	1459.450	1350.850	1468.950	1422.550	1514.550	1350.850	1514.550	61.182	1443.270
2PEX	2ORS	25/100	1418.850	1405.050	1449.050	1435.250	1510.150	1405.050	1510.150	40.703	1443.670
2PEX	SOM	25/100	1396.350	1407.350	1460.650	1435.250	1483.350	1396.350	1483.350	36.199	1436.590
2PEX	3OAS	25/100	1407.750	1440.450	1422.250	1464.950	1509.250	1407.750	1509.250	39.921	1448.930
2PEX	3ORS	25/100	1455.550	1442.350	1395.850	1448.650	1535.850	1395.850	1535.850	50.582	1455.650
2PEX	IM	25/100	1396.350	1407.350	1460.650	1435.250	1483.350	1396.350	1483.350	36.199	1436.590
2PCX	CIM	25/100	1439.450	1451.450	1447.350	1369.650	1443.250	1369.650	1451.450	34.161	1430.230
2PCX	E2ORS	25/100	1384.950	1417.450	1425.750	1447.350	1490.050	1384.950	1490.050	38.935	1433.110
2PCX	2OAS	25/100	1464.150	1458.850	1458.550	1459.650	1437.650	1437.650	1464.150	10.378	1455.770
2PCX	2ORS	25/100	1426.350	1427.350	1423.750	1472.950	1505.550	1423.750	1505.550	36.629	1451.190
2PCX	SOM	25/100	1489.550	1431.550	1421.250	1466.350	1495.950	1421.250	1495.950	33.588	1460.930
2PCX	3OAS	25/100	1517.850	1394.650	1432.950	1425.250	1493.750	1394.650	1517.850	51.095	1452.890
2PCX	3ORS	25/100	1364.350	1407.950	1432.950	1468.050	1498.650	1364.350	1498.650	52.127	1434.390
2PCX	IM	25/100	1389.750	1461.450	1391.550	1436.450	1433.150	1389.750	1461.450	31.047	1422.470
MPX	CIM	25/100	1436.650	1467.550	1413.750	1495.250	1465.750	1413.750	1495.250	31.338	1455.790
MPX	E2ORS	25/100	1404.450	1438.550	1435.450	1438.150	1431.125	1404.450	1438.550	14.338	1429.545
MPX	2OAS	25/100	1468.450	1425.750	1505.450	1468.550	1435.950	1425.750	1505.450	31.457	1460.830
MPX	2ORS	25/100	1400.650	1456.150	1406.850	1454.750	1404.950	1400.650	1456.150	28.192	1424.670
MPX	SOM	25/100	1469.850	1442.350	1420.950	1527.050	1498.050	1420.950	1527.050	42.422	1471.650
MPX	3OAS	25/100	1473.350	1422.850	1389.750	1441.150	1468.450	1389.750	1473.350	34.417	1439.110
MPX	3ORS	25/100	1456.750	1425.450	1465.450	1501.350	1434.250	1425.450	1501.350	29.794	1456.650
MPX	IM	25/100	1462.150	1465.350	1430.550	1503.950	1478.550	1430.550	1503.950	26.680	1468.110

ตารางที่ ข.3 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 25 เครื่องจักร 9 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
LOX	CIM	25/100	1450.050	1461.950	1467.050	1478.650	1455.650	1450.050	1478.650	10.996	1462.670
LOX	E2ORS	25/100	1422.350	1473.450	1419.050	1495.550	1467.750	1419.050	1495.550	33.555	1455.630
LOX	2OAS	25/100	1389.150	1453.250	1447.150	1469.250	1482.950	1389.150	1482.950	35.931	1448.350
LOX	2ORS	25/100	1458.450	1425.750	1429.150	1384.550	1501.850	1384.550	1501.850	43.478	1439.950
LOX	SOM	25/100	1375.250	1398.850	1470.850	1425.850	1503.650	1375.250	1503.650	52.342	1434.890
LOX	3OAS	25/100	1449.850	1443.650	1381.950	1432.350	1523.550	1381.950	1523.550	50.800	1446.270
LOX	3ORS	25/100	1444.150	1416.050	1440.550	1403.150	1397.050	1397.050	1444.150	21.398	1420.190
LOX	IM	25/100	1453.650	1452.450	1441.650	1498.750	1474.350	1441.650	1498.750	22.664	1464.170
EERX	CIM	25/100	1503.050	1497.750	1540.350	1558.750	1523.350	1497.750	1558.750	25.501	1524.650
EERX	E2ORS	25/100	1560.550	1509.550	1504.650	1523.350	1589.250	1504.650	1589.250	36.297	1537.470
EERX	2OAS	25/100	1620.250	1512.750	1540.350	1523.350	1636.650	1512.750	1636.650	57.543	1566.670
EERX	2ORS	25/100	1475.450	1510.150	1456.550	1572.850	1571.650	1456.550	1572.850	53.696	1517.330
EERX	SOM	25/100	1494.650	1501.350	1518.350	1537.850	1584.750	1494.650	1584.750	36.164	1527.390
EERX	3OAS	25/100	1434.650	1514.450	1514.650	1543.950	1566.750	1434.650	1566.750	49.932	1514.890
EERX	3ORS	25/100	1625.950	1502.650	1540.350	1616.550	1622.250	1502.650	1625.950	56.514	1581.550
EERX	IM	25/100	1494.650	1501.350	1518.350	1537.850	1584.750	1494.650	1584.750	36.164	1527.390
PBX	CIM	25/100	1482.350	1464.950	1416.450	1413.850	1479.950	1413.850	1482.350	33.868	1451.510
PBX	E2ORS	25/100	1458.450	1448.550	1395.650	1480.850	1485.650	1395.650	1485.650	35.975	1453.830
PBX	2OAS	25/100	1437.350	1480.050	1390.650	1426.450	1444.350	1390.650	1480.050	32.247	1435.770
PBX	2ORS	25/100	1440.350	1440.450	1411.650	1438.350	1479.450	1411.650	1479.450	24.197	1442.050
PBX	SOM	25/100	1487.450	1460.750	1441.050	1451.450	1485.550	1441.050	1487.450	20.623	1465.250
PBX	3OAS	25/100	1367.550	1480.650	1479.050	1414.250	1438.150	1367.550	1480.650	47.460	1435.930
PBX	3ORS	25/100	1447.050	1454.150	1441.150	1442.350	1503.650	1441.150	1503.650	26.206	1457.670
PBX	IM	25/100	1420.950	1440.950	1366.450	1425.350	1476.050	1366.450	1476.050	39.688	1425.950
ERX	CIM	25/100	1503.050	1497.750	1540.350	1558.750	1523.350	1497.750	1558.750	25.501	1524.650
ERX	E2ORS	25/100	1560.550	1509.550	1504.650	1523.350	1589.250	1504.650	1589.250	36.297	1537.470
ERX	2OAS	25/100	1620.250	1512.750	1540.350	1611.550	1636.650	1512.750	1636.650	54.375	1584.310
ERX	2ORS	25/100	1475.450	1510.150	1456.550	1572.850	1571.050	1456.550	1572.850	53.544	1517.210
ERX	SOM	25/100	1553.450	1512.750	1540.350	1546.350	1539.250	1512.750	1553.450	15.428	1538.430
ERX	3OAS	25/100	1434.650	1514.450	1514.650	1543.950	1566.750	1434.650	1566.750	49.888	1514.830
ERX	3ORS	25/100	1625.950	1502.650	1540.350	1616.550	1622.250	1502.650	1625.950	56.514	1581.550
ERX	IM	25/100	1494.650	1501.350	1518.350	1537.850	1584.750	1494.650	1584.750	36.164	1527.390

ตารางที่ ข.3 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 25 เครื่องจักร 9 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
CX	CIM	25/100	1451.550	1466.750	1447.950	1438.150	1420.150	1420.150	1466.750	17.241	1444.910
CX	E2ORS	25/100	1434.950	1451.850	1437.750	1471.550	1509.150	1434.950	1509.150	30.548	1461.050
CX	2OAS	25/100	1464.350	1495.750	1489.050	1537.350	1471.050	1464.350	1537.350	28.643	1491.510
CX	2ORS	25/100	1495.050	1437.450	1402.250	1456.850	1400.350	1400.350	1495.050	39.702	1438.390
CX	SOM	25/100	1443.050	1492.250	1439.750	1434.350	1504.050	1434.350	1504.050	32.786	1462.690
CX	3OAS	25/100	1464.350	1434.250	1428.850	1465.650	1474.550	1428.850	1474.550	20.534	1453.530
CX	3ORS	25/100	1412.350	1462.250	1386.350	1490.750	1546.750	1386.350	1546.750	63.582	1459.690
CX	IM	25/100	1443.050	1492.250	1439.750	1434.350	1504.050	1434.350	1504.050	32.786	1462.690
PMX	CIM	25/100	1431.050	1384.550	1450.750	1435.050	1428.550	1384.550	1450.750	24.721	1431.050
PMX	E2ORS	25/100	1396.050	1429.050	1378.050	1469.850	1414.050	1378.050	1469.850	35.008	1414.050
PMX	2OAS	25/100	1435.150	1403.350	1390.250	1475.250	1455.250	1390.250	1475.250	35.302	1435.150
PMX	2ORS	25/100	1486.950	1412.050	1409.750	1460.350	1405.550	1405.550	1486.950	36.650	1412.050
PMX	SOM	25/100	1467.950	1412.850	1390.650	1416.050	1391.850	1390.650	1467.950	31.363	1412.850
PMX	3OAS	25/100	1420.050	1425.050	1381.450	1424.150	1491.550	1381.450	1491.550	39.659	1424.150
PMX	3ORS	25/100	1385.750	1440.350	1442.150	1493.150	1416.750	1385.750	1493.150	39.427	1440.350
PMX	IM	25/100	1487.750	1448.650	1449.550	1446.250	1439.650	1439.650	1487.750	19.058	1448.650
AEX	CIM	25/100	1472.950	1469.750	1466.350	1507.650	1474.250	1466.350	1507.650	16.750	1472.950
AEX	E2ORS	25/100	1468.850	1453.750	1443.250	1496.450	1443.950	1443.250	1496.450	22.228	1453.750
AEX	2OAS	25/100	1403.250	1466.850	1437.850	1464.650	1490.350	1403.250	1490.350	33.265	1464.650
AEX	2ORS	25/100	1465.550	1487.750	1437.950	1487.650	1529.750	1437.950	1529.750	33.748	1487.650
AEX	SOM	25/100	1464.750	1520.650	1459.750	1451.050	1402.650	1402.650	1520.650	42.041	1459.750
AEX	3OAS	25/100	1434.650	1466.450	1432.150	1458.950	1470.150	1432.150	1470.150	17.892	1458.950
AEX	3ORS	25/100	1453.950	1458.550	1496.050	1462.450	1513.850	1453.950	1513.850	26.477	1462.450
AEX	IM	25/100	1458.450	1476.050	1461.950	1475.150	1482.050	1458.450	1482.050	10.048	1475.150
SCX	CIM	25/100	1469.350	1489.350	1523.350	1483.450	1495.450	1469.350	1523.350	19.923	1489.350
SCX	E2ORS	25/100	1396.050	1502.450	1460.150	1454.050	1483.450	1396.050	1502.450	40.230	1460.150
SCX	2OAS	25/100	1423.550	1482.050	1485.350	1500.850	1470.750	1423.550	1500.850	29.408	1482.050
SCX	2ORS	25/100	1417.750	1485.650	1414.950	1480.950	1476.550	1414.950	1485.650	35.597	1476.550
SCX	SOM	25/100	1468.250	1480.450	1458.350	1454.350	1499.450	1454.350	1499.450	18.280	1468.250
SCX	3OAS	25/100	1479.050	1506.050	1431.450	1474.550	1469.050	1431.450	1506.050	26.780	1474.550
SCX	3ORS	25/100	1462.350	1456.850	1433.250	1425.650	1453.250	1425.650	1462.350	15.921	1453.250
SCX	IM	25/100	1468.250	1480.450	1458.350	1454.350	1499.450	1454.350	1499.450	18.280	1468.250

ตารางที่ ข.3 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 25 เครื่องจักร 9 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
OX	CIM	25/100	1448.650	1491.450	1462.150	1495.950	1463.750	1448.650	1495.950	20.380	1463.750
OX	E2ORS	25/100	1375.150	1413.650	1397.950	1469.950	1461.850	1375.150	1469.950	40.975	1413.650
OX	2OAS	25/100	1457.150	1490.750	1472.850	1459.550	1466.750	1457.150	1490.750	13.433	1466.750
OX	2ORS	25/100	1443.650	1493.350	1440.450	1467.950	1514.150	1440.450	1514.150	31.812	1467.950
OX	SOM	25/100	1410.450	1456.250	1458.350	1461.950	1502.450	1410.450	1502.450	32.617	1458.350
OX	3OAS	25/100	1490.850	1490.250	1408.450	1437.850	1513.850	1408.450	1513.850	43.515	1490.250
OX	3ORS	25/100	1387.450	1482.950	1455.350	1451.850	1468.250	1387.450	1482.950	36.606	1455.350
OX	IM	25/100	1494.350	1492.350	1449.150	1507.450	1141.550	1141.550	1507.450	155.522	1492.350

ตารางที่ ข.4 แสดงผลการทดลองการแก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	4542.275	4950.925	4638.325	5049.575	4560.175	4542.275	5049.575	235.455	4748.255
1PX	E2ORS	25/100	5104.475	5087.925	5005.625	5170.525	4606.175	4606.175	5170.525	225.126	4994.945
1PX	2OAS	25/100	4951.925	5007.825	5167.625	4504.675	5096.075	4504.675	5167.625	259.935	4945.625
1PX	2ORS	25/100	5085.175	4007.475	4527.425	4698.925	5123.575	4007.475	5123.575	457.299	4688.515
1PX	SOM	25/100	5062.325	4719.775	4911.625	4603.625	4420.525	4420.525	5062.325	252.169	4743.575
1PX	3OAS	25/100	5062.875	4322.425	4904.475	4479.175	4975.675	4322.425	5062.875	327.431	4748.925
1PX	3ORS	25/100	5078.025	5147.975	5163.125	4614.375	5072.425	4614.375	5163.125	227.702	5015.185
1PX	IM	25/100	4987.425	5298.375	3941.125	4543.125	5044.825	3941.125	5298.375	533.911	4762.975
2PEX	CIM	25/100	4766.725	5029.525	3941.625	4543.125	5044.820	3941.625	5044.820	454.317	4665.164
2PEX	E2ORS	25/100	4786.975	5041.025	4162.625	4632.425	4971.825	4162.625	5041.025	349.746	4718.975
2PEX	2OAS	25/100	4869.175	4741.575	5076.125	5026.775	5099.525	4741.575	5099.525	152.754	4962.635
2PEX	2ORS	25/100	4609.025	4921.225	4966.525	4472.675	5143.175	4472.675	5143.175	274.441	4822.525
2PEX	SOM	25/100	4662.925	4926.825	5055.775	5050.974	4901.025	4662.925	5055.775	159.751	4919.505
2PEX	3OAS	25/100	4920.525	4881.925	4792.825	4861.275	4203.475	4203.475	4920.525	299.069	4732.005
2PEX	3ORS	25/100	4890.375	4827.875	4936.775	4903.875	4882.975	4827.875	4936.775	39.611	4888.375
2PEX	IM	25/100	4823.625	4257.875	4914.175	4795.375	4424.725	4257.875	4914.175	285.195	4643.155

ตารางที่ ๑.๔ (ต่อ) แสดงผลการทดลองการแก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
1PX	CIM	25/100	4542.275	4950.925	4638.325	5049.575	4560.175	4542.275	5049.575	235.455	4748.255
1PX	E2ORS	25/100	5104.475	5087.925	5005.625	5170.525	4606.175	4606.175	5170.525	225.126	4994.945
1PX	2OAS	25/100	4951.925	5007.825	5167.625	4504.675	5096.075	4504.675	5167.625	259.935	4945.625
1PX	2ORS	25/100	5085.175	4007.475	4527.425	4698.925	5123.575	4007.475	5123.575	457.299	4688.515
1PX	SOM	25/100	5062.325	4719.775	4911.625	4603.625	4420.525	4420.525	5062.325	252.169	4743.575
1PX	3OAS	25/100	5062.875	4322.425	4904.475	4479.175	4975.675	4322.425	5062.875	327.431	4748.925
1PX	3ORS	25/100	5078.025	5147.975	5163.125	4614.375	5072.425	4614.375	5163.125	227.702	5015.185
1PX	IM	25/100	4987.425	5298.375	3941.125	4543.125	5044.825	3941.125	5298.375	533.911	4762.975
2PCX	CIM	25/100	4854.875	4999.075	3973.775	4892.525	4862.725	3973.775	4999.075	419.226	4716.595
2PCX	E2ORS	25/100	4830.675	4617.225	4502.475	4851.625	4784.275	4502.475	4851.625	151.284	4717.255
2PCX	2OAS	25/100	4928.375	4850.575	5053.775	4697.075	4955.525	4697.075	5053.775	133.335	4897.065
2PCX	2ORS	25/100	4825.975	4887.775	3920.275	4746.525	4911.775	3920.275	4911.775	417.579	4658.465
2PCX	SOM	25/100	4844.225	4901.525	5075.975	4486.675	4869.675	4486.675	5075.975	215.122	4835.615
2PCX	3OAS	25/100	4819.275	4127.325	4696.975	4968.125	4618.975	4127.325	4968.125	318.646	4646.135
2PCX	3ORS	25/100	4919.475	5059.525	4887.475	4529.225	480.388	480.388	5059.525	#####	3975.218
2PCX	IM	25/100	478.475	4688.525	4204.975	4119.525	4544.375	478.475	4688.525	#####	3607.175
2PCX	CIM	25/100	4854.875	4999.075	3973.775	4892.525	4862.725	3973.775	4999.075	419.226	4716.595
2PCX	E2ORS	25/100	4830.675	4617.225	4502.475	4851.625	4784.275	4502.475	4851.625	151.284	4717.255
2PCX	2OAS	25/100	4928.375	4850.575	5053.775	4697.075	4955.525	4697.075	5053.775	133.335	4897.065
2PCX	2ORS	25/100	4825.975	4887.775	3920.275	4746.525	4911.775	3920.275	4911.775	417.579	4658.465
2PCX	SOM	25/100	4844.225	4901.525	5075.975	4486.675	4869.675	4486.675	5075.975	215.122	4835.615
2PCX	3OAS	25/100	4819.275	4127.325	4696.975	4968.125	4618.975	4127.325	4968.125	318.646	4646.135
2PCX	3ORS	25/100	4919.475	5059.525	4887.475	4529.225	480.388	480.388	5059.525	#####	3975.218
2PCX	IM	25/100	478.475	4688.525	4204.975	4119.525	4544.375	478.475	4688.525	#####	3607.175
MPX	CIM	25/100	5014.025	5064.625	4632.325	5143.725	4787.725	4632.325	5143.725	211.957	4928.485
MPX	E2ORS	25/100	4996.975	4927.475	5060.475	4536.025	4905.175	4536.025	5060.475	204.526	4885.225
MPX	2OAS	25/100	4901.075	4808.275	4893.275	5048.525	5069.175	4808.275	5069.175	111.166	4944.065
MPX	2ORS	25/100	4801.225	4851.025	4824.125	4651.575	5025.125	4651.575	5025.125	133.428	4830.615
MPX	SOM	25/100	4773.725	5051.675	5059.525	4880.675	5253.125	4773.725	5253.125	184.157	5003.745
MPX	3OAS	25/100	4976.175	4786.425	4776.525	4305.475	5085.975	4305.475	5085.975	298.808	4786.115
MPX	3ORS	25/100	5018.725	4688.375	5136.125	5188.375	5146.825	4688.375	5188.375	204.124	5035.685
MPX	IM	25/100	5139.075	5118.225	5027.725	5018.875	4875.475	4875.475	5139.075	104.302	5035.875

ตารางที่ ข.4 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
LOX	CIM	25/100	4401.225	4792.525	5116.425	5133.975	4971.975	4401.225	5133.975	302.359	4883.225
LOX	E2ORS	25/100	4959.975	5078.675	5079.425	4580.875	4869.575	4580.875	5079.425	205.878	4913.705
LOX	2OAS	25/100	4909.375	5250.525	5220.975	4830.375	4879.875	4830.375	5250.525	200.840	5018.225
LOX	2ORS	25/100	4945.925	4694.575	5093.075	4696.475	5069.875	4694.575	5093.075	194.850	4899.985
LOX	SOM	25/100	5080.375	4732.075	5103.375	4767.975	4218.975	4218.975	5103.375	357.766	4780.555
LOX	3OAS	25/100	4855.175	5003.675	4967.325	4396.625	4733.075	4396.625	5003.675	244.605	4791.175
LOX	3ORS	25/100	5018.475	5054.475	5139.675	5036.025	4545.175	4545.175	5139.675	235.839	4958.765
LOX	IM	25/100	5026.425	4352.525	4738.175	4691.275	5083.625	4352.525	5083.625	293.793	4778.405
EERX	CIM	25/100	5097.825	5084.625	4459.775	4788.925	4199.975	4199.975	5097.825	393.193	4726.225
EERX	E2ORS	25/100	5028.925	534.575	5304.125	5245.925	5009.625	534.575	5304.125	#####	4224.635
EERX	2OAS	25/100	5325.375	5507.675	4598.025	5594.075	5345.025	4598.025	5594.075	394.233	5274.035
EERX	2ORS	25/100	5236.025	5011.125	5339.725	5385.475	4820.425	4820.425	5385.475	237.899	5158.555
EERX	SOM	25/100	5158.275	4835.425	5303.375	4532.475	4356.225	4356.225	5303.375	401.437	4837.155
EERX	3OAS	25/100	4938.725	5160.975	5258.225	5240.095	5000.925	4938.725	5258.225	143.394	5119.789
EERX	3ORS	25/100	5303.725	5280.475	5464.925	5158.475	5353.725	5158.475	5464.925	111.534	5312.265
EERX	IM	25/100	5005.325	4757.475	4480.675	4888.225	5205.125	4480.675	5205.125	271.641	4867.365
PBX	CIM	25/100	4538.775	4955.025	5012.725	4320.721	4684.525	4320.721	5012.725	288.484	4702.354
PBX	E2ORS	25/100	4855.225	4893.925	5028.475	5033.325	4679.675	4679.675	5033.325	145.644	4898.125
PBX	2OAS	25/100	4807.875	4946.375	5020.025	4364.825	4827.375	4364.825	5020.025	254.853	4793.295
PBX	2ORS	25/100	4714.875	4588.325	5062.825	4969.125	4982.075	4588.325	5062.825	201.716	4863.445
PBX	SOM	25/100	4886.025	4780.925	4795.525	4901.125	5096.475	4780.925	5096.475	126.069	4892.015
PBX	3OAS	25/100	4869.875	5133.625	4873.875	4906.825	4629.225	4629.225	5133.625	178.912	4882.685
PBX	3ORS	25/100	4902.075	4603.225	4961.825	4835.525	4898.975	4603.225	4961.825	139.870	4840.325
PBX	IM	25/100	4886.025	4780.925	4795.525	4901.675	5096.475	4780.925	5096.475	126.080	4892.125
ERX	CIM	25/100	5097.825	5084.625	4459.775	4788.925	4199.975	4199.975	5097.825	393.193	4726.225
ERX	E2ORS	25/100	5028.925	5324.575	5304.125	5245.125	5009.625	5009.625	5324.575	151.963	5182.475
ERX	2OAS	25/100	5325.375	5507.675	5498.025	5594.075	5345.025	5325.375	5594.075	114.957	5454.035
ERX	2ORS	25/100	5236.025	5011.125	5339.725	5385.475	4820.425	4820.425	5385.475	237.899	5158.555
ERX	SOM	25/100	5005.325	4747.475	4480.675	488.225	5205.125	488.225	5205.125	#####	3985.365
ERX	3OAS	25/100	4938.725	5160.975	5258.225	5240.975	500.925	500.925	5258.225	#####	4219.965
ERX	3ORS	25/100	5303.725	5280.925	5464.925	5158.475	5353.725	5158.475	5464.925	111.502	5312.355
ERX	IM	25/100	5005.325	4757.475	4480.675	4888.225	5205.125	4480.675	5205.125	271.641	4867.365

ตารางที่ ข.4 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
CX	CIM	25/100	4791.325	4423.475	4390.775	4746.325	5007.025	4390.775	5007.025	261.178	4671.785
CX	E2ORS	25/100	5129.675	4992.525	5074.425	4830.225	5010.875	4830.225	5129.675	112.991	5007.545
CX	2OAS	25/100	5118.575	4821.725	5219.075	4528.575	5071.875	4528.575	5219.075	278.256	4951.965
CX	2ORS	25/100	5067.225	5027.725	5058.025	4498.375	4985.375	4498.375	5067.225	241.921	4927.345
CX	SOM	25/100	4786.825	4656.525	5197.125	4149.275	5123.625	4149.275	5197.125	419.864	4782.675
CX	3OAS	25/100	4890.825	4806.075	5239.525	5067.975	5168.025	4806.075	5239.525	182.897	5034.485
CX	3ORS	25/100	5041.125	5133.525	5065.825	4567.375	5208.125	4567.375	5208.125	252.132	5003.195
CX	IM	25/100	4768.875	4656.525	5197.125	4149.275	5123.625	4149.275	5197.125	419.896	4779.085
PMX	CIM	25/100	5101.325	5070.325	5081.925	4811.075	5044.075	4811.075	5101.325	119.577	5021.745
PMX	E2ORS	25/100	4856.825	4784.725	4899.525	4248.425	5959.875	4248.425	5959.875	622.615	4949.875
PMX	2OAS	25/100	5071.375	4987.775	5029.025	5025.225	4959.875	4959.875	5071.375	42.599	5014.655
PMX	2ORS	25/100	5090.075	4971.575	5032.825	4862.072	4955.325	4862.072	5090.075	85.828	4982.374
PMX	SOM	25/100	4967.425	5100.975	4939.275	4936.075	4931.875	4931.875	5100.975	71.726	4975.125
PMX	3OAS	25/100	4899.075	4698.475	5081.475	4596.275	4965.325	4596.275	5081.475	197.868	4848.125
PMX	3ORS	25/100	5048.575	4837.225	5140.675	4275.475	4970.275	4275.475	5140.675	342.248	4854.445
PMX	IM	25/100	4967.425	5100.975	4939.279	4936.075	4931.875	4931.875	5100.975	71.725	4975.126
AEX	CIM	25/100	5184.025	5144.525	5315.575	5062.225	4926.725	4926.725	5315.575	144.417	5126.615
AEX	E2ORS	25/100	4689.875	5119.275	4492.025	5031.925	4880.625	4492.025	5119.275	254.984	4842.745
AEX	2OAS	25/100	5123.425	5164.075	5254.575	5029.275	5155.625	5029.275	5254.575	81.149	5145.395
AEX	2ORS	25/100	5308.225	4998.675	5102.675	5092.275	5148.275	4998.675	5308.225	113.484	5130.025
AEX	SOM	25/100	5191.475	5200.675	4839.425	4638.575	5090.375	4638.575	5200.675	245.561	4992.105
AEX	3OAS	25/100	4974.675	5201.825	5170.225	5164.125	5037.625	4974.675	5201.825	98.157	5109.695
AEX	3ORS	25/100	5171.775	5172.075	5182.075	5168.175	5144.825	5144.825	5182.075	13.837	5167.785
AEX	IM	25/100	5191.475	5200.725	4839.425	4638.575	5090.375	4638.575	5200.725	245.572	4992.115
SCX	CIM	25/100	5030.075	4584.625	4638.476	4840.975	4990.275	4584.625	5030.075	201.165	4816.885
SCX	E2ORS	25/100	4519.925	5210.425	5115.925	5151.725	5205.225	4519.925	5210.425	293.712	5040.645
SCX	2OAS	25/100	5026.076	4950.275	5091.025	4981.025	5022.475	4950.275	5091.025	53.147	5014.175
SCX	2ORS	25/100	4713.675	4711.725	5121.425	5009.975	5086.775	4711.725	5121.425	201.277	4928.715
SCX	SOM	25/100	4309.825	4527.825	4801.575	4662.825	4905.175	4309.825	4905.175	233.738	4641.445
SCX	3OAS	25/100	4610.825	4812.025	4812.625	5132.325	4944.775	4610.825	5132.325	192.322	4862.515
SCX	3ORS	25/100	4885.225	4802.975	5184.225	5169.325	4563.425	4563.425	5184.225	261.736	4921.035
SCX	IM	25/100	4309.475	4527.825	4801.575	4662.825	4905.175	4309.475	4905.175	233.862	4641.375

ตารางที่ ข.4 (ต่อ) แสดงผลการทดลองการแก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	MOP	Pop/gen	seed 111	seed 222	seed 333	seed 444	seed 555	Min	Max	SD	Mean
			metres	metres	metres	metres	metres	metres	metres	metres	metres
OX	CIM	25/100	4979.83	5050.88	4644.43	4029.73	4886.58	4029.73	5050.875	414.4	4718.285
OX	E2ORS	25/100	4795.28	4930.13	5054.18	4932.73	4795.28	4795.28	5054.175	109.169	4901.515
OX	2OAS	25/100	5067.08	4988.03	4897.38	5042.78	4996.73	4897.38	5067.075	65.1957	4998.395
OX	2ORS	25/100	5118.38	4871.93	4945.03	4756.78	4866.23	4756.78	5118.375	133.676	4911.665
OX	SOM	25/100	5094.73	5150.58	4930.68	4980.43	4959.28	4930.68	5150.575	94.6271	5023.135
OX	3OAS	25/100	4999.78	4852.33	5037.13	4867.03	4455.28	4455.28	5037.125	230.898	4842.305
OX	3ORS	25/100	5042.13	5172.98	4999.38	5141.18	5067.83	4999.38	5172.975	71.3436	5084.695
OX	IM	25/100	4891.33	4916.88	4848.68	5071.13	5191.63	4848.68	5191.625	143.271	4983.925

ตารางที่ ข. 5 แสดงผลการทดลองของการสลับสายพันธุ์ (COP) การกลายพันธุ์ (MOP) การแก้ปัญหา 10 เครื่องจักร 3ผลิตภัณฑ์

COP	ระยะทาง (เมตร)	MOP	ระยะทาง (เมตร)
1PX	197.586	CIM	199.300
2PEX	194.913	E2ORS	201.086
2PCX	191.215	2OAS	201.708
MPX	194.026	2ORS	197.406
LOX	195.690	SOM	197.507
EERX	219.490	3OAS	195.607
PBX	192.350	3ORS	199.257
ERX	218.371	IM	198.307
CX	202.038		
PMX	191.220		
AEX	199.804		
SCX	193.610		
OX	193.726		

ตารางที่ ข. 6 แสดงผลการทดลองของการสลัปลายพันธุ์ (COP) การกลายพันธุ์ (MOP) การ
แก้ปัญหา 20 เครื่องจักร 5 ผลิตรถยนต์

COP	ระยะทาง (เมตร)	MOP	ระยะทาง (เมตร)
1PX	1,230.165	CIM	1,235.530
2PEX	1,313.071	E2ORS	1,322.950
2PCX	1,306.681	2OAS	1,359.130
MPX	1,326.850	2ORS	1,310.190
LOX	1,316.946	SOM	1,307.440
EERX	1,154.356	3OAS	1,295.460
PBX	1,312.594	3ORS	1,335.010
ERX	1,325.438	IM	1,296.210
CX	1,334.649		
PMX	1310.164		
AEX	1305.768		
SCX	1260.744		
OX	1332.363		

ตารางที่ ข. 7 แสดงผลการทดลองของการสลัปลายพันธุ์ (COP) การกลายพันธุ์ (MOP) การ
แก้ปัญหา 15 เครื่องจักร 9 ผลิตภัณฑ์

COP	ระยะทาง (เมตร)	MOP	ระยะทาง (เมตร)
1PX	1,459.395	CIM	1,465.100
2PEX	1,440.545	E2ORS	1,454.600
2PCX	1,442.623	2OAS	1,476.000
MPX	1,450.794	2ORS	1,461.000
LOX	1,446.515	SOM	1,465.800
EERX	1,537.168	3OAS	1,461.800
PBX	1,445.995	3ORS	1,472.800
ERX	1,540.730	IM	1,467.500
CX	1,459.308		
PMX	1,427.288		
AEX	1,466.913		
SCX	1,471.550		
OX	1,463.550		

ตารางที่ ข. 8 แสดงผลการทดลองของการสลัปลายพันธุ์ (COP) การกลายพันธุ์ (MOP) การ
แก้ปัญหา 30 เครื่องจักร 10 ผลิตภัณฑ์

COP	ระยะทาง (เมตร)	MOP	ระยะทาง (เมตร)
1PX	4,831.000	CIM	4,804.000
2PEX	4,794.042	E2ORS	4,867.500
2PCX	4,506.690	2OAS	5,031.800
MPX	4,931.226	2ORS	4,920.100
LOX	4,878.005	SOM	4,800.900
EERX	4,940.003	3OAS	4,817.200
PBX	4,845.546	3ORS	4,951.500
ERX	4,863.293	IM	4,755.900
CX	4,894.760		
PMX	4,952.684		
AEX	5,063.310		
SCX	4858.349		
OX	4932.990		