

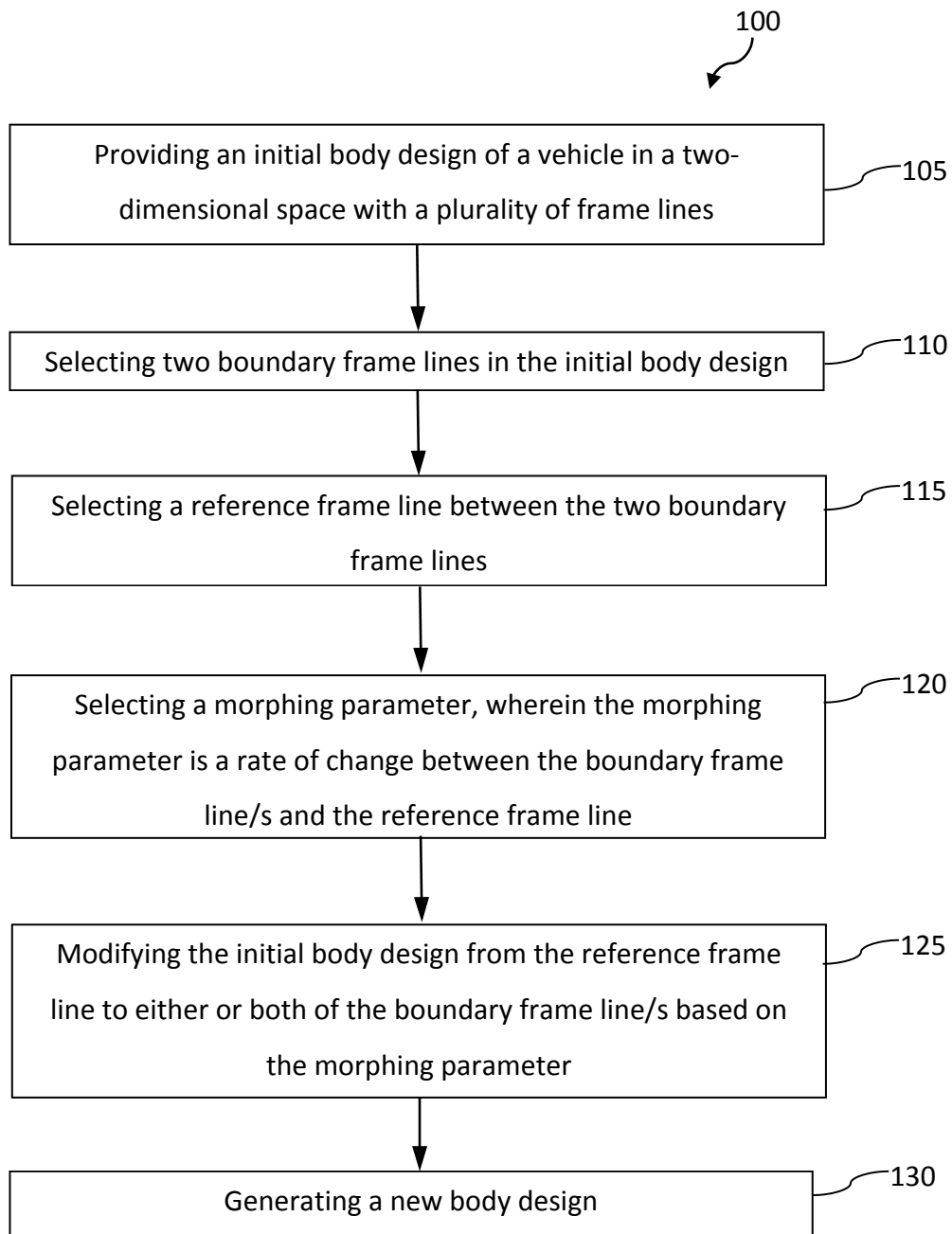


Figure 1

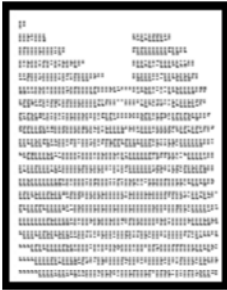
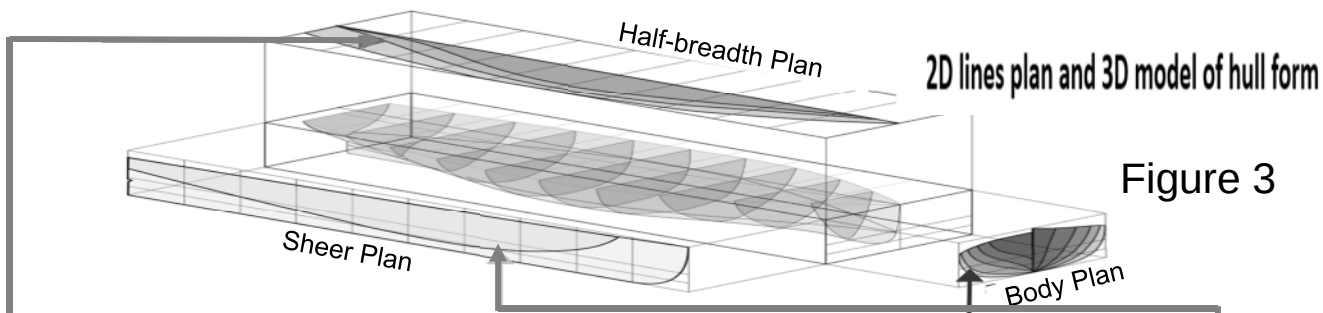


Figure 2

Frames	166.9816	168.3254	169.6693	171.0131	172.3569	173.7017	175.0455	176.3893	177.7331	179.077	180.4208	181.7646	183.1084	184.4523	185.7961	187.1399	188.4837	189.8276
Waterlines	19.1	16	15.97883	15.90708	15.77799	15.58609	15.32641	14.99697	14.59389	14.09908	13.50867	12.80159	11.9364	10.8799	9.577739	7.962127	5.922425	2.745769
18.718	16	15.99125	15.93103	15.80442	15.61371	15.36894	15.06802	14.69684	14.24755	13.70753	13.06465	12.31086	11.41923	10.35379	9.048626	7.431026	5.33755	0.844635
18.336	15.99672	15.95419	15.85421	15.68805	15.46067	15.17347	14.82763	14.40785	13.90301	13.30753	12.61257	11.81138	10.88865	9.811359	8.51201	6.88326	4.715866	
17.572	15.91434	15.80234	15.63607	15.4087	15.1193	14.75677	14.30778	13.76676	13.13451	12.42534	11.64243	10.76701	9.787578	8.682087	7.38405	5.773476	3.34721	
17.19	15.83076	15.68884	15.48631	15.21262	14.86867	14.44651	13.93421	13.33148	12.65282	11.91116	11.10002	10.20522	9.216805	8.106107	6.807801	5.194802	2.43838	
16.426	15.44795	15.16502	14.81004	14.38887	13.90599	13.36378	12.77923	12.15722	11.48363	10.74345	9.923091	9.026763	8.048	6.946624	5.651717	3.957108		
15.662	14.32676	13.89555	13.43732	12.9607	12.46241	11.9365	11.38196	10.79543	10.1597	9.457183	8.67686	7.810852	6.858007	5.786693	4.486966	2.607275		
15.28	13.62703	13.18012	12.71612	12.23284	11.73148	11.21014	10.66574	10.09093	9.472904	8.796114	8.04325	7.202524	6.267667	5.203935	3.902877	1.858107		
14.516	12.17242	11.71588	11.24691	10.76661	10.27439	9.76634	9.238778	8.683776	8.095642	7.46553	6.772025	5.990738	5.103821	4.070947	2.734191			
13.752	10.69257	10.24686	9.794057	9.331737	8.852969	8.353073	7.834395	7.2944	6.728348	6.129222	5.487841	4.775771	3.951185	2.951334	1.567533			
13.37	9.977938	9.533535	9.081848	8.618832	8.141297	7.647155	7.135424	6.604701	6.04957	5.465302	4.845148	4.163707	3.371766	2.3952	0.961732			
12.606	8.656835	8.200646	7.739458	7.272616	6.796293	6.304775	5.794475	5.267349	4.726261	4.171598	3.589277	2.951851	2.222817	1.321769				
12.224	8.07047	7.607125	7.139717	6.668035	6.188094	5.69278	5.178663	4.648467	4.108055	3.559046	2.990291	2.37922	1.698107	0.862504				
11.46	7.066643	6.589863	6.112358	5.632626	5.148353	4.653694	4.14402	3.621764	3.093933	2.566211	2.038539	1.501188	0.922652	0.260465				
11.078	6.636144	6.154693	5.674007	5.193411	4.711781	4.22394	3.725327	3.217819	2.709873	2.207752	1.709605	1.204561	0.667316	0.073108				
10.696	6.239732	5.758002	5.277366	4.799284	4.323001	3.844224	3.360328	2.873888	2.391036	1.917386	1.448268	0.970671	0.472545					
9.932	5.51835	5.052174	4.587081	4.124681	3.664527	3.207463	2.756899	2.314375	1.881073	1.45919	1.045615	0.628165	0.197013					
9.55	5.189665	4.73755	4.285744	3.834445	3.384825	2.940959	2.506663	2.082445	1.670996	1.273501	0.884694	0.500454	0.108602					
9.168	4.882971	4.447275	4.010733	3.571886	3.134211	2.703593	2.284293	1.879066	1.48952	1.114415	0.752219	0.400366	0.054948					
8.404	4.333923	3.934728	3.530971	3.122077	2.713401	2.316293	1.935702	1.576139	1.238718	0.919325	0.616284	0.332689	0.06923					
8.022	4.088447	3.706484	3.323826	2.938484	2.555945	2.18402	1.828134	1.495066	1.19197	0.923796	0.699177	0.537062	0.439451	0.538447	0.663969	0.79058	0.167473	
7.64	3.864875	3.500561	3.142231	2.786922	2.438042	2.09926	1.775175	1.47515	1.220482	1.035906	0.937642	0.9502	1.059011	1.176994	1.292343	1.356055	1.065481	
6.494	3.351593	3.062927	2.793014	2.542132	2.314971	2.122256	1.975483	1.881232	1.841332	1.853933	1.895056	1.939846	1.973366	1.992537	1.997784	1.963041	1.564899	
5.73	3.101545	2.873958	2.670032	2.492154	2.348005	2.244273	2.190907	2.173893	2.16482	2.14886	2.126966	2.100899	2.07037	2.037357	2.001371	1.937689	1.490713	
4.966	2.886191	2.709327	2.556671	2.429635	2.330723	2.261198	2.220373	2.209908	2.202753	2.175722	2.129898	2.070211	2.004383	1.936189	1.864507	1.75362	1.096119	
4.584	2.782847	2.631801	2.501595	2.393481	2.309774	2.24799	2.206549	2.186683	2.169034	2.131379	2.074037	2.004661	1.927901	1.84805	1.758152	1.610047	0.742372	
4.202	2.681212	2.555031	2.446609	2.355041	2.280974	2.22191	2.17755	2.145043	2.111563	2.060532	1.992368	1.913888	1.830012	1.739757	1.629764	1.425709		
3.82	2.581297	2.478619	2.389198	2.311096	2.243011	2.183245	2.131081	2.083925	2.033868	1.969839	1.891339	1.805178	1.715001	1.613535	1.479304	1.188065		
3.056	2.377183	2.310102	2.245396	2.178365	2.109128	2.039473	1.970574	1.900482	1.824904	1.741009	1.650683	1.554087	1.447245	1.316263	1.106157	0.168614		
2.674	2.261724	2.200646	2.139607	2.07357	2.002455	1.92952	1.855235	1.777829	1.69601	1.607165	1.513292	1.412641	1.297739	1.148631	0.873735			
2.292	2.126301	2.062529	1.999096	1.933565	1.864855	1.792815	1.716323	1.634802	1.548432	1.456686	1.360407	1.257252	1.134241	0.941195	0.388069			
1.91	1.963975	1.895096	1.828442	1.762783	1.696368	1.626147	1.549088	1.464745	1.374778	1.280944	1.184497	1.081491	0.938733	0.694263				
1.528	1.772472	1.701555	1.633232	1.567026	1.500711	1.429794	1.351046	1.264427	1.172174	1.07679	0.977149	0.870675	0.710782					
1.146	1.549923	1.480378	1.411667	1.343125	1.272268	1.196909	1.114932	1.027836	0.936319	0.840988	0.74545	0.619648	0.210556					
0.764	1.281779	1.219727	1.154256	1.086788	1.013883	0.934689	0.851898	0.765479	0.674345	0.576698	0.410219							
0.382	0.918987	0.870256	0.817886	0.75929	0.687988	0.613009	0.528745	0.431724	0.305732	0.070727								
0	0.203255	0.184688	0.177071	0.105795	0.005429													



Half-breadth of waterline

Frame	35	35.5	36	36.5	37	37.5	38	38.5	39	39.5	40	40.5	41	41.5
Waterlines														
0.7 WL	22.177	22.132	22.084	22.032	21.975	21.911	21.839	21.756	21.660	21.548	21.419	21.272	21.107	20.924
1.4 WL	22.766	22.735	22.699	22.656	22.605	22.545	22.473	22.388	22.287	22.169	22.033	21.877	21.703	21.509
2.1 WL	23.022	22.997	22.964	22.922	22.871	22.809	22.735	22.646	22.541	22.419	22.278	22.119	21.940	21.742
2.8 WL	23.069	23.048	23.018	22.981	22.933	22.874	22.802	22.716	22.614	22.493	22.354	22.196	22.018	21.820
3.5 WL	23.071	23.050	23.022	22.986	22.940	22.884	22.815	22.733	22.634	22.518	22.384	22.230	22.058	21.866
4.2 WL	23.072	23.052	23.025	22.990	22.946	22.892	22.825	22.746	22.651	22.539	22.409	22.262	22.096	21.910
4.9 WL	23.073	23.053	23.027	22.993	22.950	22.898	22.833	22.756	22.664	22.556	22.431	22.289	22.129	21.951
5.6 WL	23.073	23.054	23.029	22.995	22.954	22.902	22.839	22.764	22.675	22.570	22.450	22.313	22.160	21.990
6.3 WL	23.074	23.055	23.030	22.997	22.956	22.906	22.844	22.771	22.684	22.584	22.468	22.339	22.193	22.032
7.0 WL	23.074	23.056	23.031	22.999	22.959	22.909	22.849	22.779	22.696	22.602	22.494	22.373	22.237	22.084
7.7 WL	23.074	23.056	23.032	23.001	22.961	22.913	22.856	22.790	22.714	22.627	22.527	22.414	22.286	22.140
8.4 WL	23.075	23.057	23.033	23.003	22.965	22.920	22.867	22.806	22.736	22.656	22.563	22.456	22.334	22.197
9.1 WL	23.076	23.058	23.035	23.006	22.971	22.929	22.880	22.825	22.762	22.689	22.605	22.507	22.396	22.271
9.8 WL	23.076	23.060	23.038	23.011	22.978	22.940	22.897	22.850	22.795	22.731	22.655	22.568	22.468	22.354
10.5 WL	23.078	23.062	23.042	23.017	22.988	22.957	22.922	22.881	22.834	22.777	22.710	22.633	22.544	22.443
11.2 WL	23.079	23.065	23.047	23.027	23.004	22.979	22.949	22.914	22.873	22.824	22.765	22.698	22.620	22.531
11.9 WL	23.082	23.071	23.057	23.041	23.023	23.001	22.976	22.947	22.911	22.868	22.818	22.760	22.693	22.617
12.6 WL	23.086	23.078	23.067	23.055	23.040	23.022	23.001	22.976	22.946	22.910	22.868	22.820	22.764	22.700
13.3 WL	23.091	23.084	23.076	23.066	23.054	23.040	23.023	23.002	22.978	22.950	22.916	22.877	22.832	22.781
14.0 WL	23.094	23.089	23.083	23.076	23.067	23.056	23.043	23.027	23.009	22.988	22.962	22.933	22.899	22.860
14.7 WL	23.096	23.093	23.089	23.084	23.078	23.071	23.062	23.051	23.039	23.024	23.007	22.987	22.964	22.937
15.4 WL	23.098	23.096	23.094	23.092	23.088	23.085	23.080	23.075	23.068	23.061	23.052	23.041	23.029	23.015
16.1 WL	23.099	23.098	23.098	23.098	23.098	23.098	23.098	23.097	23.098	23.098	23.098	23.097	23.097	23.096

Height of buttock

Frame	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5
Buttocks														
0.0 B	2.858	2.576	2.315	2.072	1.841	1.620	1.408	1.209	1.026	0.860	0.715	0.590	0.482	0.390
0.7 B	2.984	2.685	2.404	2.142	1.895	1.661	1.441	1.235	1.047	0.878	0.729	0.601	0.492	0.398
1.4 B	3.107	2.791	2.492	2.211	1.948	1.702	1.473	1.262	1.068	0.895	0.743	0.612	0.502	0.407
2.1 B	3.227	2.894	2.577	2.279	2.001	1.744	1.506	1.288	1.090	0.912	0.757	0.624	0.511	0.415
2.8 B	3.343	2.994	2.660	2.345	2.053	1.785	1.539	1.314	1.111	0.929	0.770	0.635	0.520	0.423
3.5 B	3.454	3.090	2.740	2.410	2.105	1.826	1.572	1.341	1.132	0.946	0.784	0.646	0.530	0.432
4.2 B	3.560	3.181	2.816	2.472	2.155	1.866	1.604	1.367	1.153	0.963	0.798	0.657	0.539	0.440
4.9 B	3.659	3.267	2.888	2.532	2.203	1.905	1.636	1.392	1.174	0.980	0.811	0.668	0.548	0.448
5.6 B	3.751	3.346	2.956	2.588	2.249	1.943	1.667	1.418	1.195	0.997	0.825	0.679	0.558	0.456
6.3 B	3.836	3.419	3.018	2.640	2.293	1.980	1.697	1.443	1.215	1.013	0.838	0.690	0.567	0.465
7.0 B	3.912	3.485	3.075	2.689	2.335	2.015	1.726	1.467	1.235	1.030	0.852	0.701	0.576	0.473
7.7 B	3.978	3.543	3.125	2.733	2.373	2.047	1.754	1.491	1.255	1.046	0.865	0.712	0.586	0.481
8.4 B	4.033	3.591	3.168	2.771	2.407	2.078	1.781	1.514	1.274	1.062	0.878	0.723	0.595	0.489
9.1 B	4.076	3.629	3.203	2.804	2.438	2.106	1.806	1.536	1.293	1.078	0.892	0.735	0.604	0.497
9.8 B	4.105	3.656	3.229	2.830	2.464	2.131	1.830	1.557	1.312	1.094	0.905	0.746	0.614	0.506
10.5 B	4.114	3.670	3.247	2.851	2.485	2.152	1.848	1.573	1.326	1.106	0.915	0.753	0.620	0.512
11.2 B	4.111	3.675	3.256	2.863	2.498	2.165	1.861	1.584	1.335	1.114	0.922	0.760	0.626	0.517
11.9 B	4.096	3.668	3.255	2.864	2.502	2.170	1.867	1.591	1.341	1.120	0.927	0.765	0.631	0.521
12.6 B	4.068	3.647	3.240	2.854	2.495	2.167	1.866	1.592	1.344	1.123	0.931	0.769	0.635	0.525
13.3 B	4.022	3.610	3.210	2.831	2.478	2.155	1.859	1.589	1.344	1.125	0.934	0.772	0.638	0.528
14.0 B	3.956	3.553	3.163	2.794	2.452	2.137	1.847	1.582	1.341	1.124	0.935	0.775	0.641	0.532
14.7 B	3.867	3.478	3.102	2.747	2.417	2.112	1.831	1.572	1.336	1.123	0.936	0.777	0.644	0.535
15.4 B	3.760	3.389	3.031	2.693	2.377	2.083	1.812	1.561	1.330	1.121	0.937	0.780	0.648	0.539
16.1 B	3.643	3.292	2.954	2.633	2.333	2.053	1.791	1.548	1.324	1.120	0.938	0.782	0.651	0.542
16.8 B	3.523	3.193	2.875	2.573	2.288	2.021	1.770	1.535	1.317	1.118	0.940	0.785	0.655	0.546

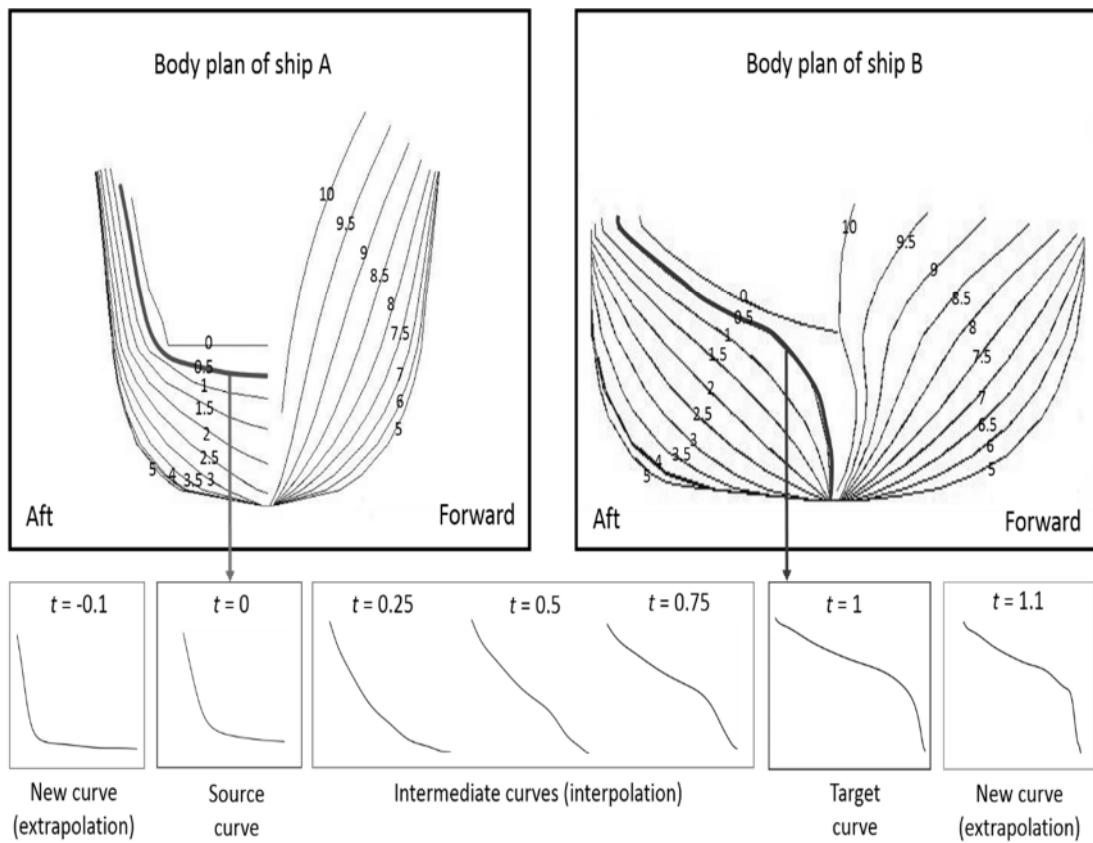


Figure 4

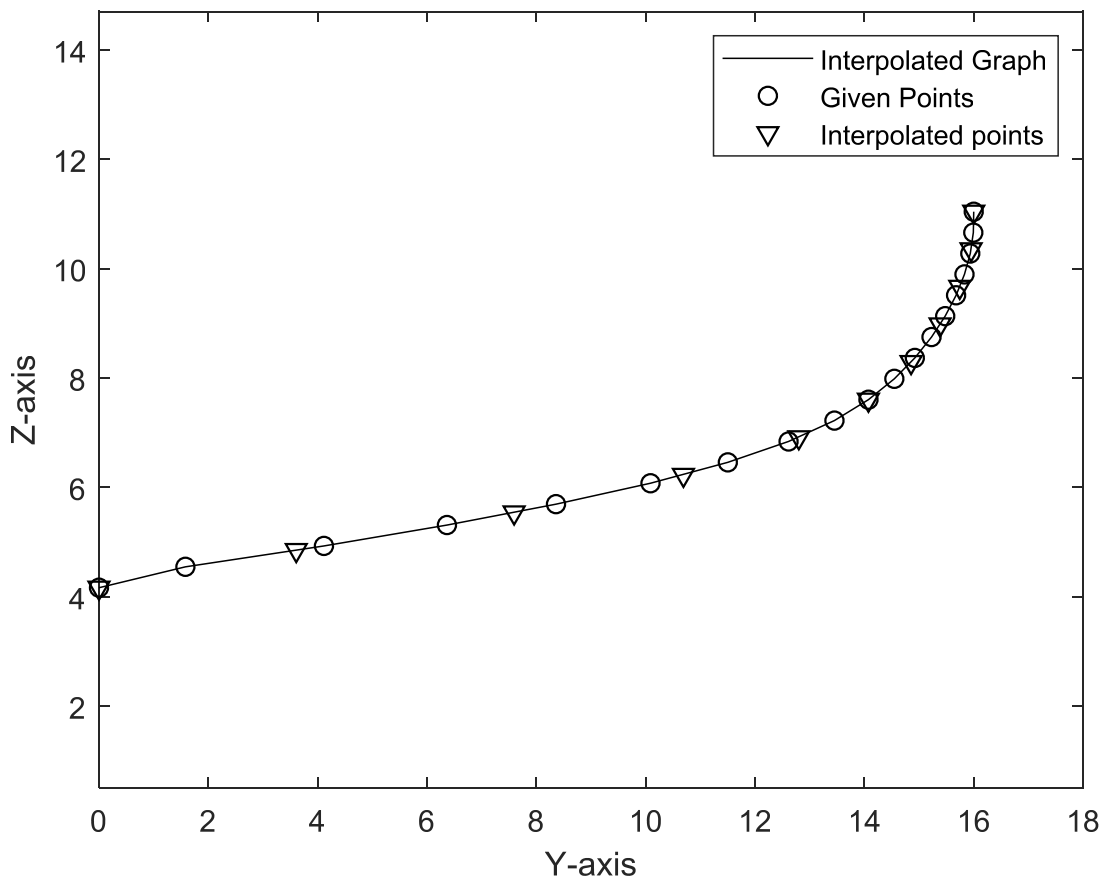


Figure 5

Vessel A



Vessel B

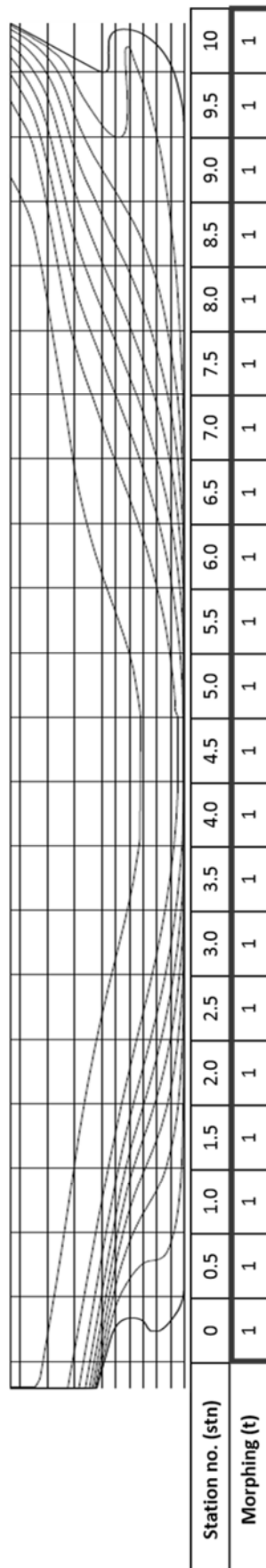


Figure 6

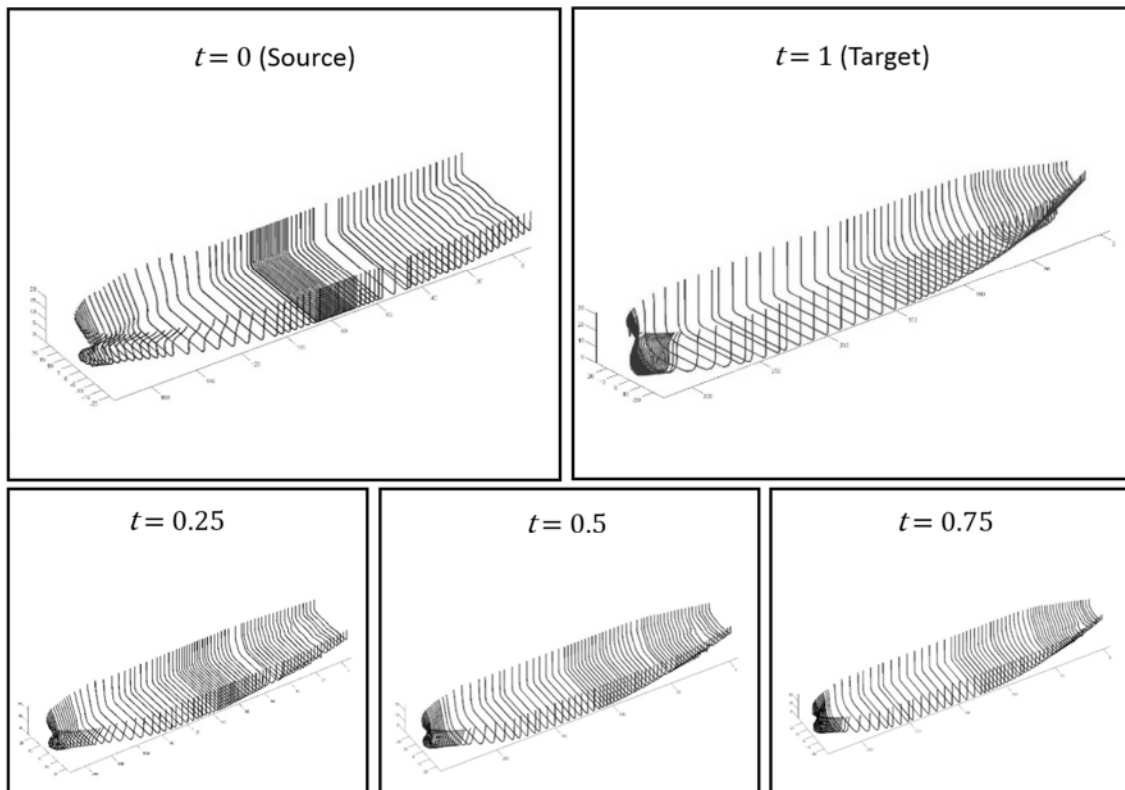


Figure 7

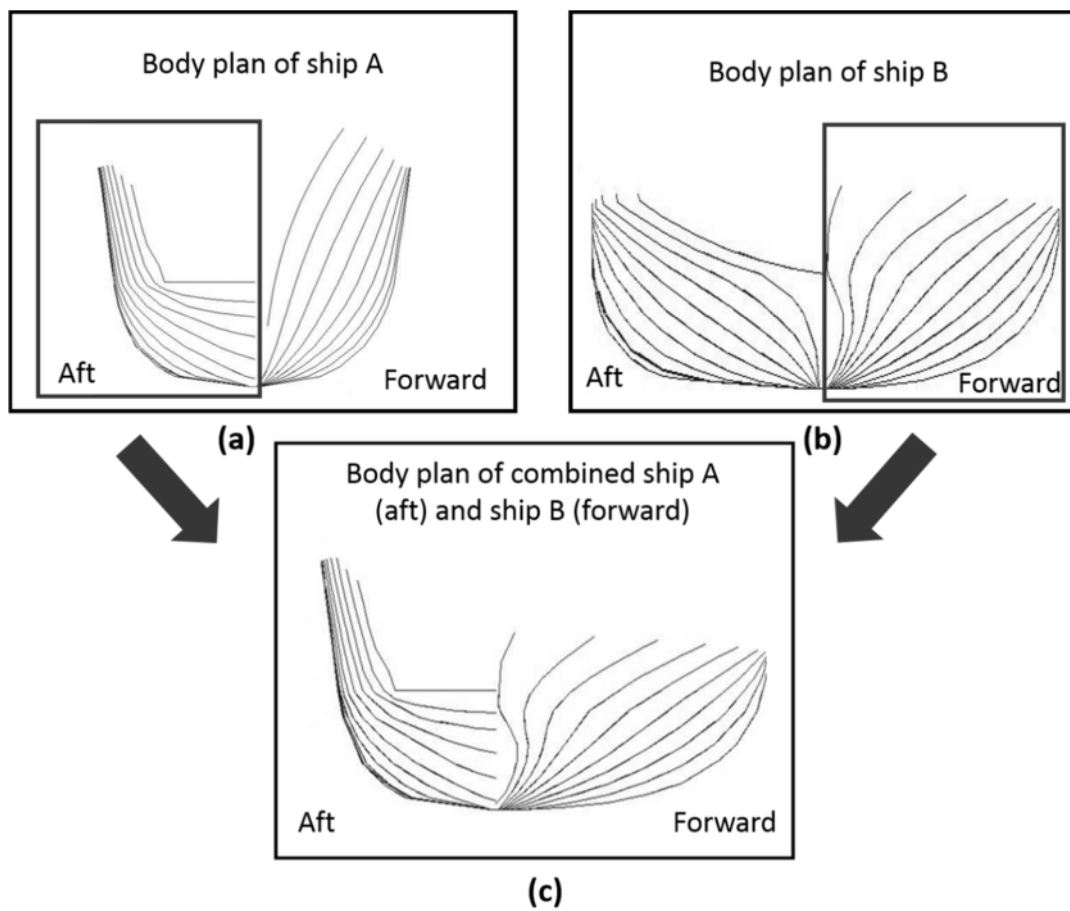


Figure 8

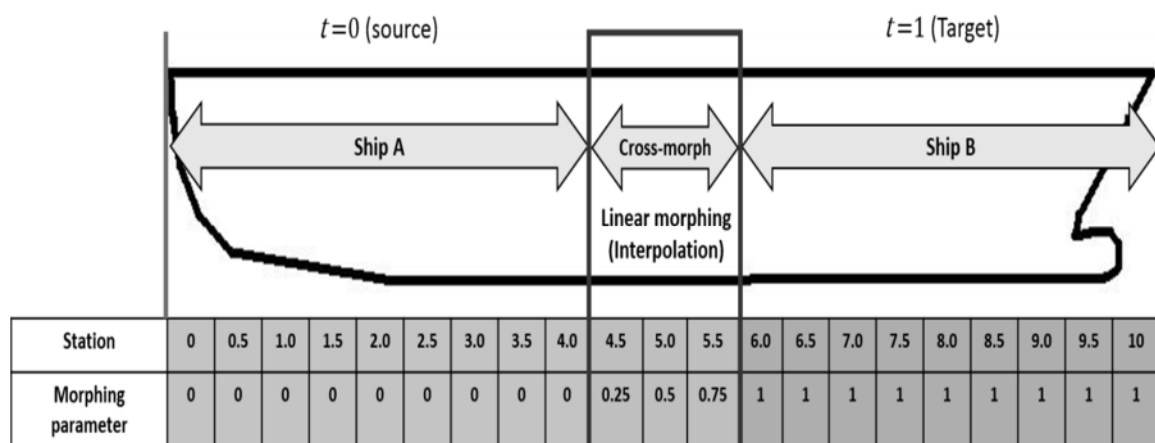


Figure 9

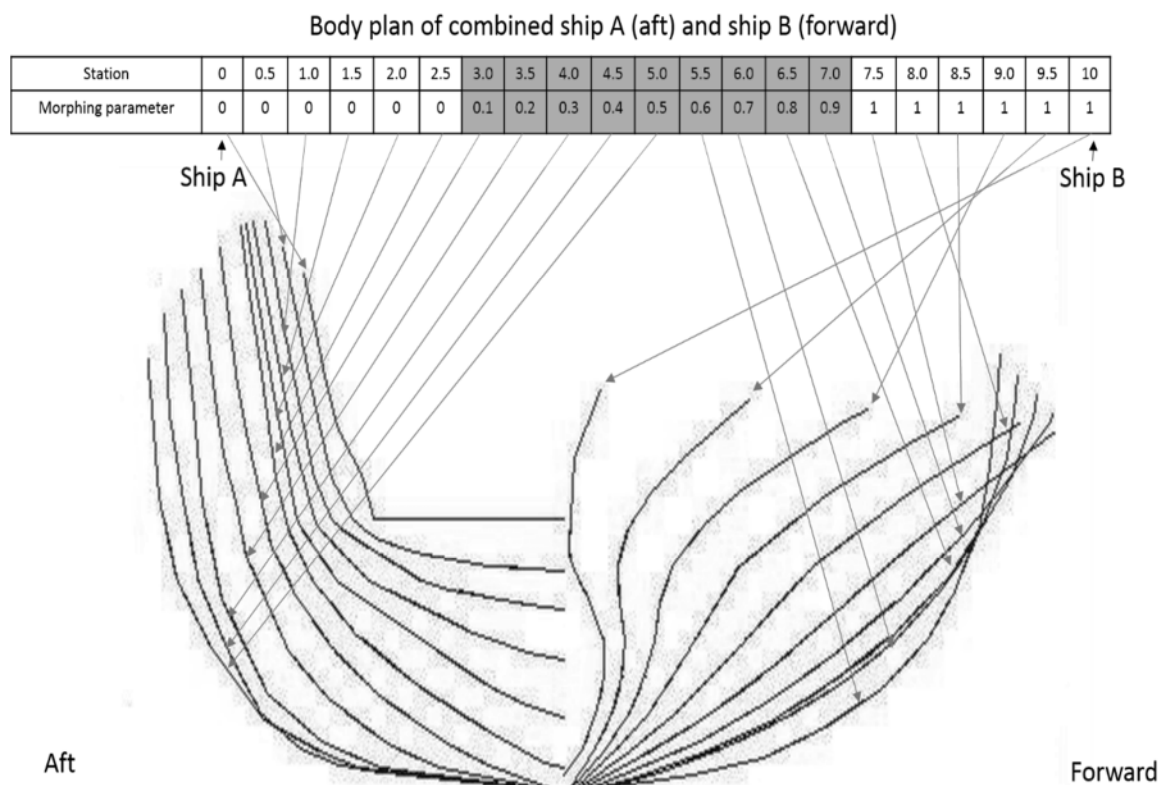
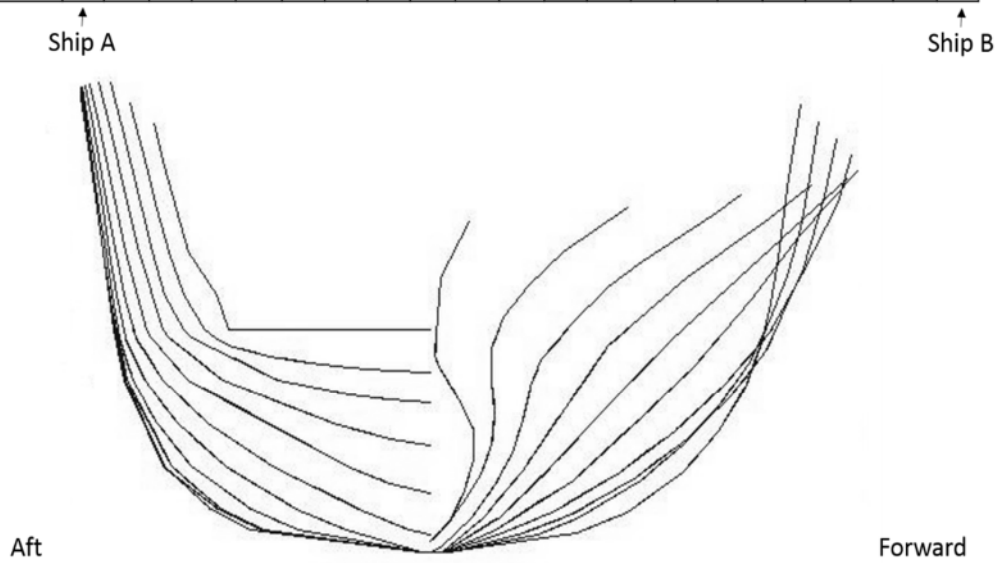


Figure 10

Body plan of combined ship A (aft) and ship B (forward)

Station	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10
Morphing parameter	0	0	0	0	0	0	0	0	0	0	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1

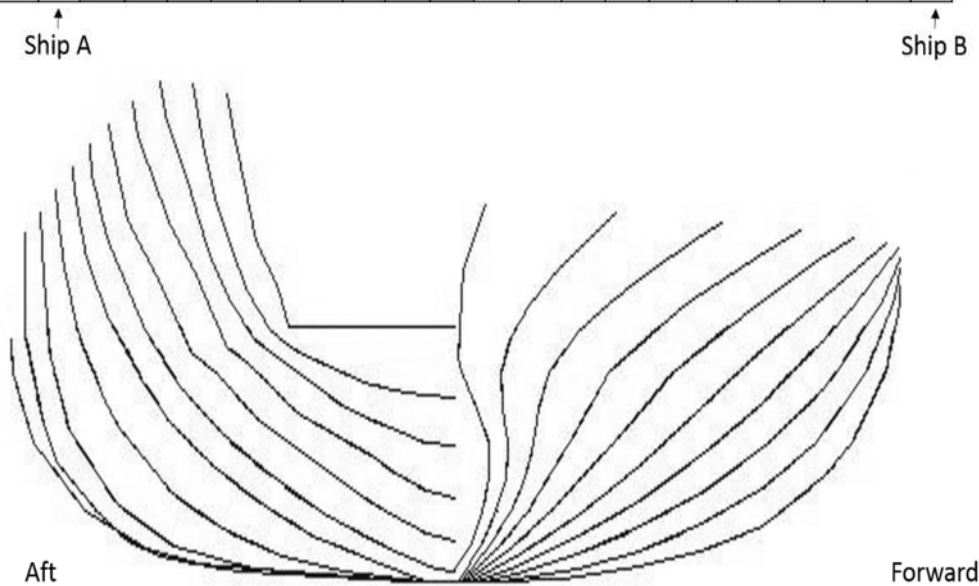


(a)

Figure 11(a)

Body plan of combined ship A (aft) and ship B (forward)

Station	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10
Morphing parameter	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1	1	1	1	1	1	1	1	1	1



(b)

Figure 11(b)

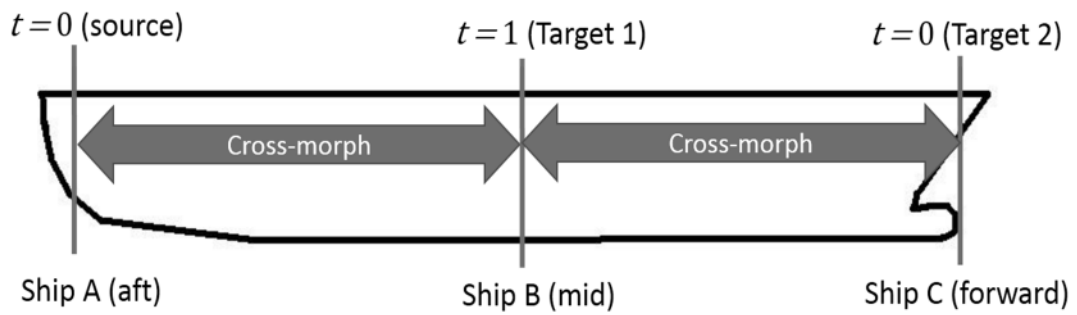


Figure 12
Body plan of ship C (Target 2)

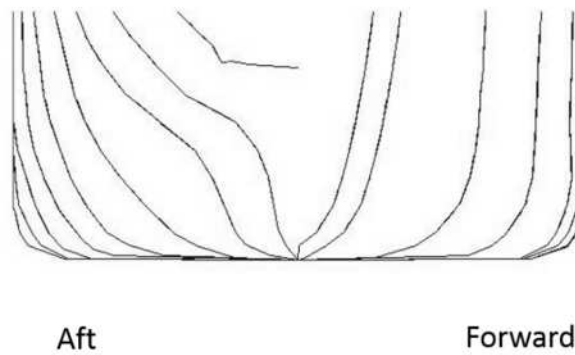


Figure 13(a)
Body plan of combined ship A (aft), ship B (mid) and ship C (forward)

Station no. (STN)	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10
Morphing parameter (t)	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0
	Ship A					Ship B						Ship C									

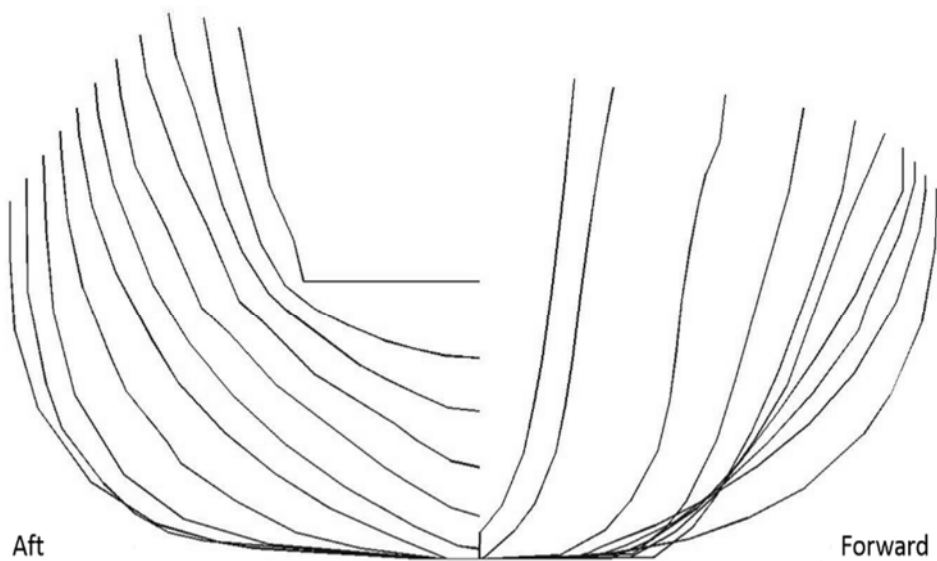


Figure 13(b)

$t = 0$ (Pipe-lay)

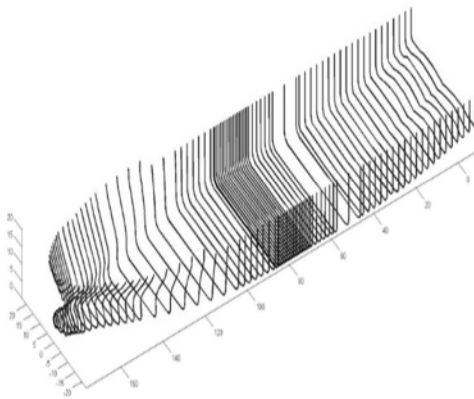


Figure 14(a)

$t = 1$ (VLCC)

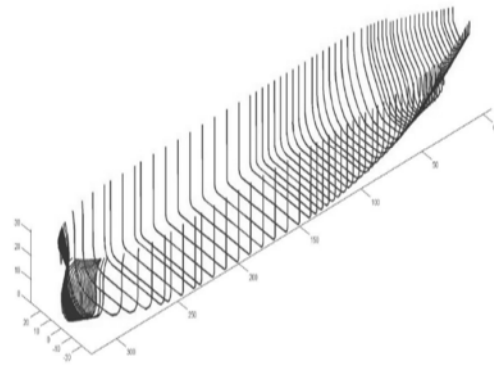


Figure 14(b)

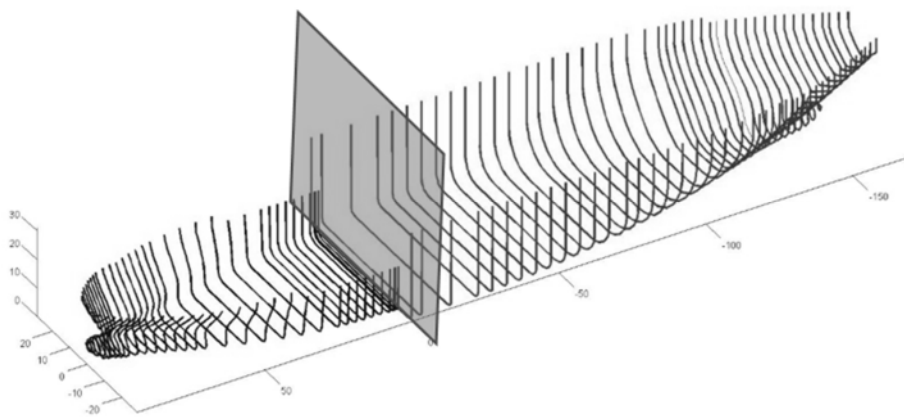


Figure 15

Combined Pipe-lay (forward) and VLCC (aft) -2D lines

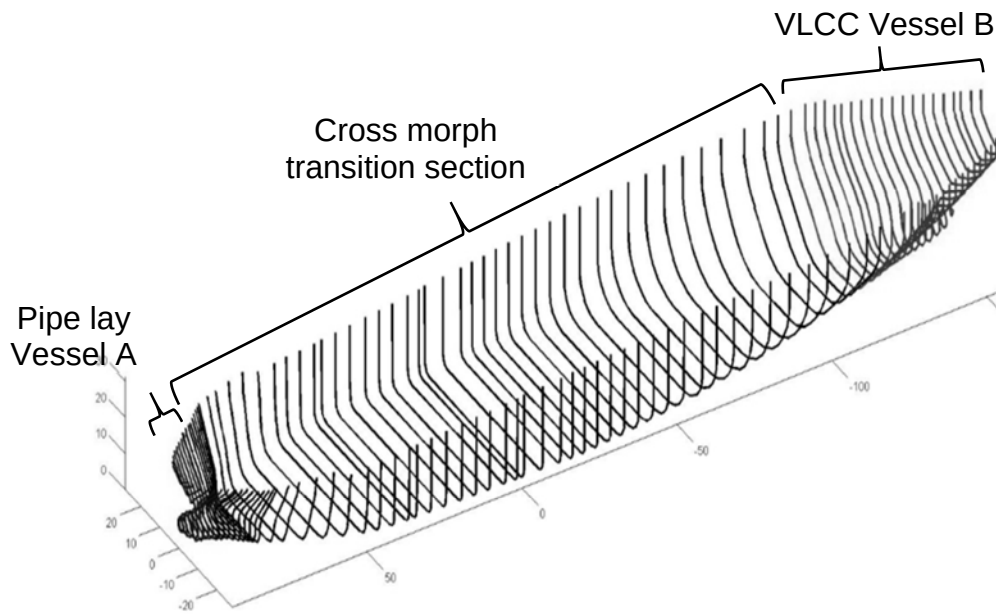


Figure 16(a)

Combined Pipe-lay (forward) and VLCC (aft) - surface

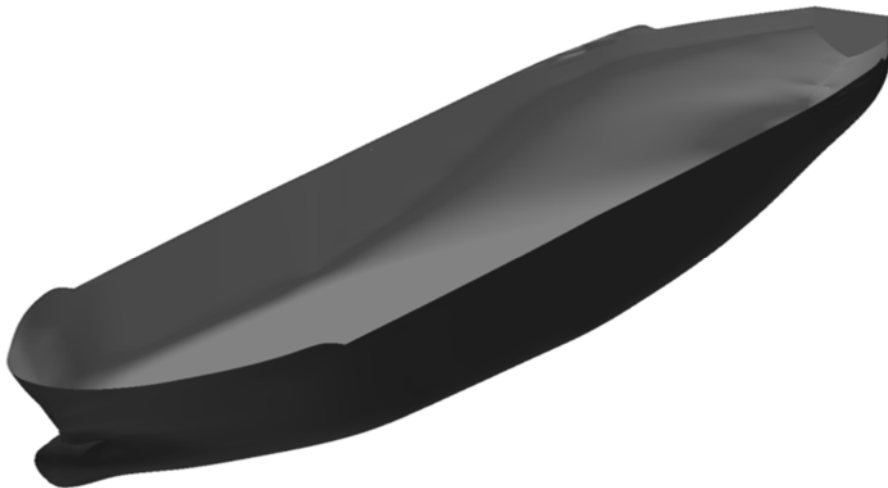


Figure 16(b)

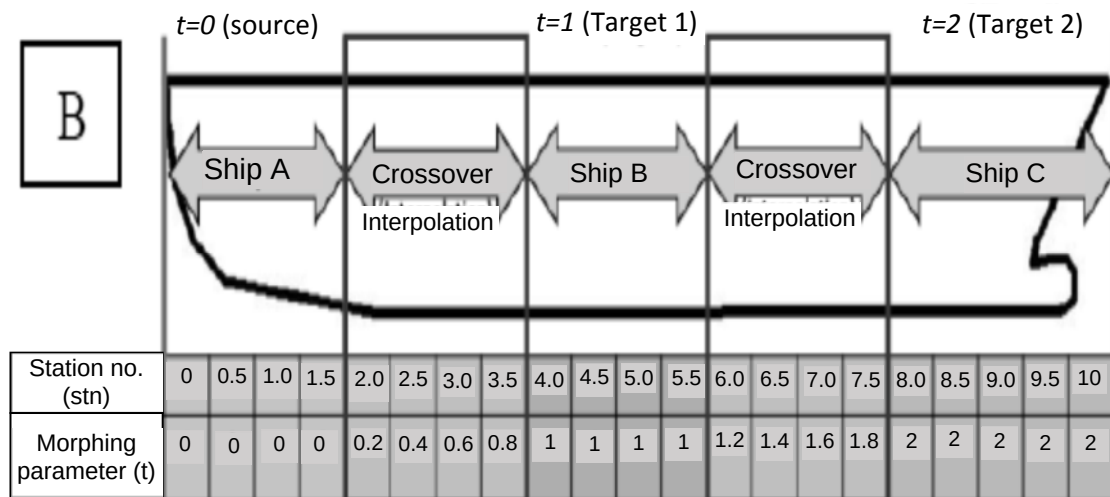


Figure 17

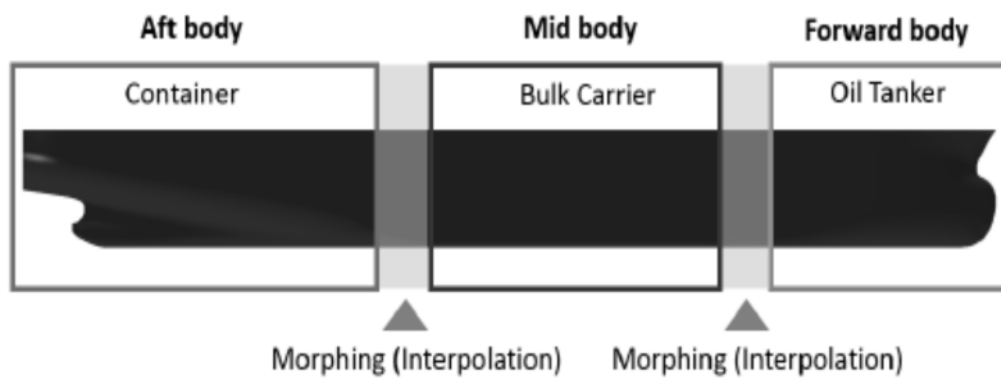


Figure 18

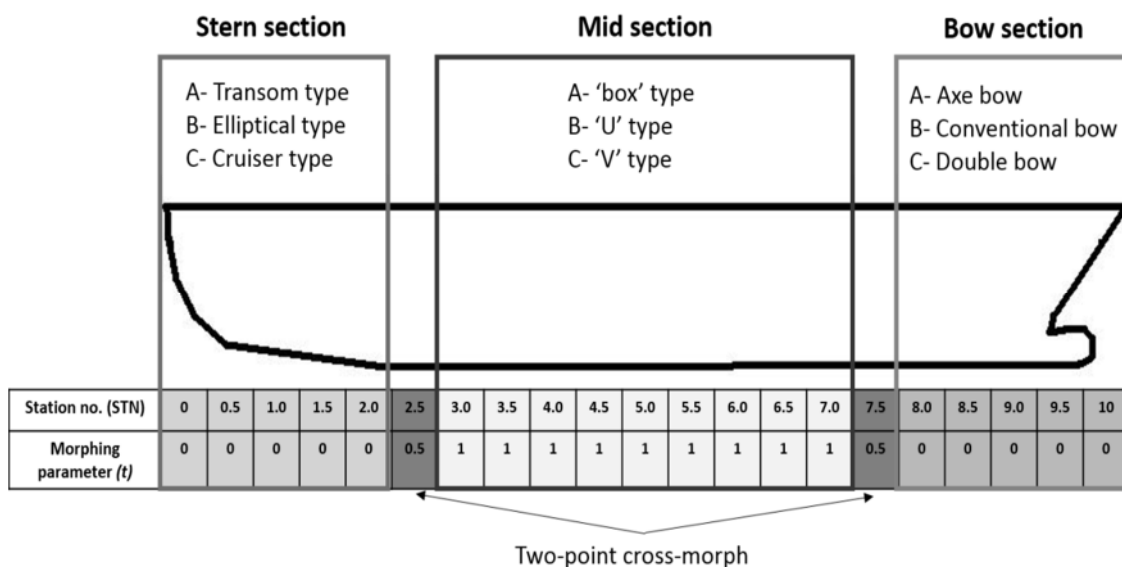


Figure 19

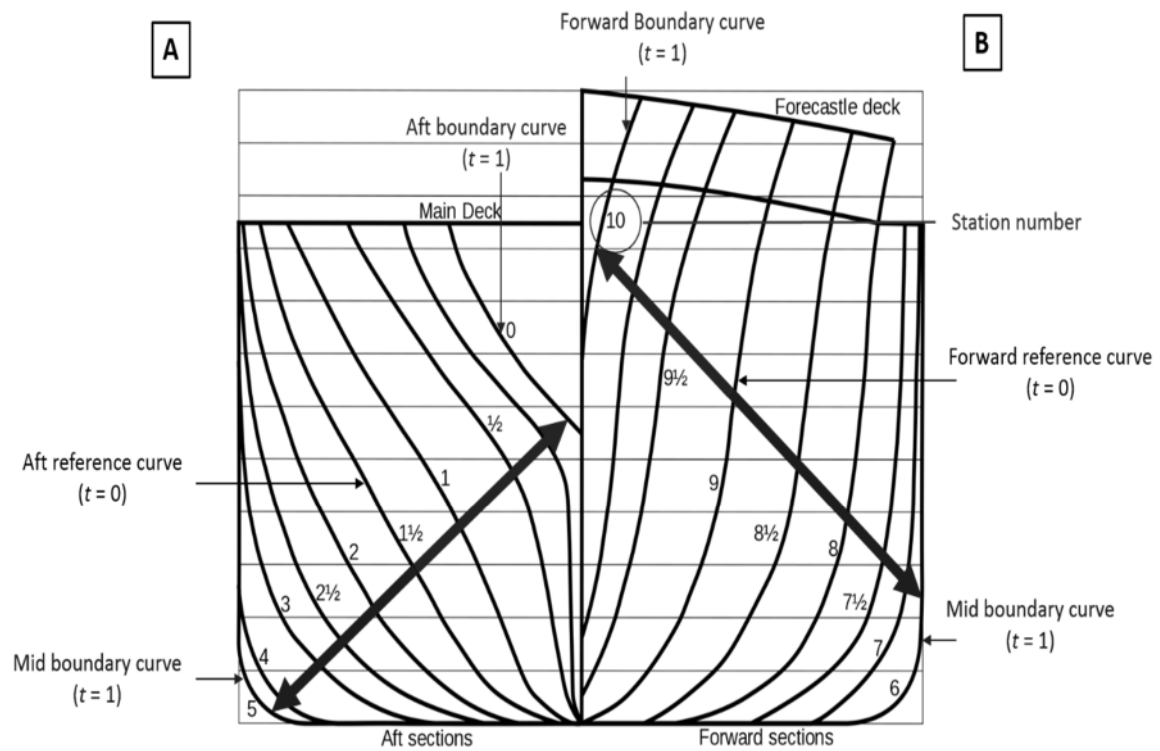


Figure 20

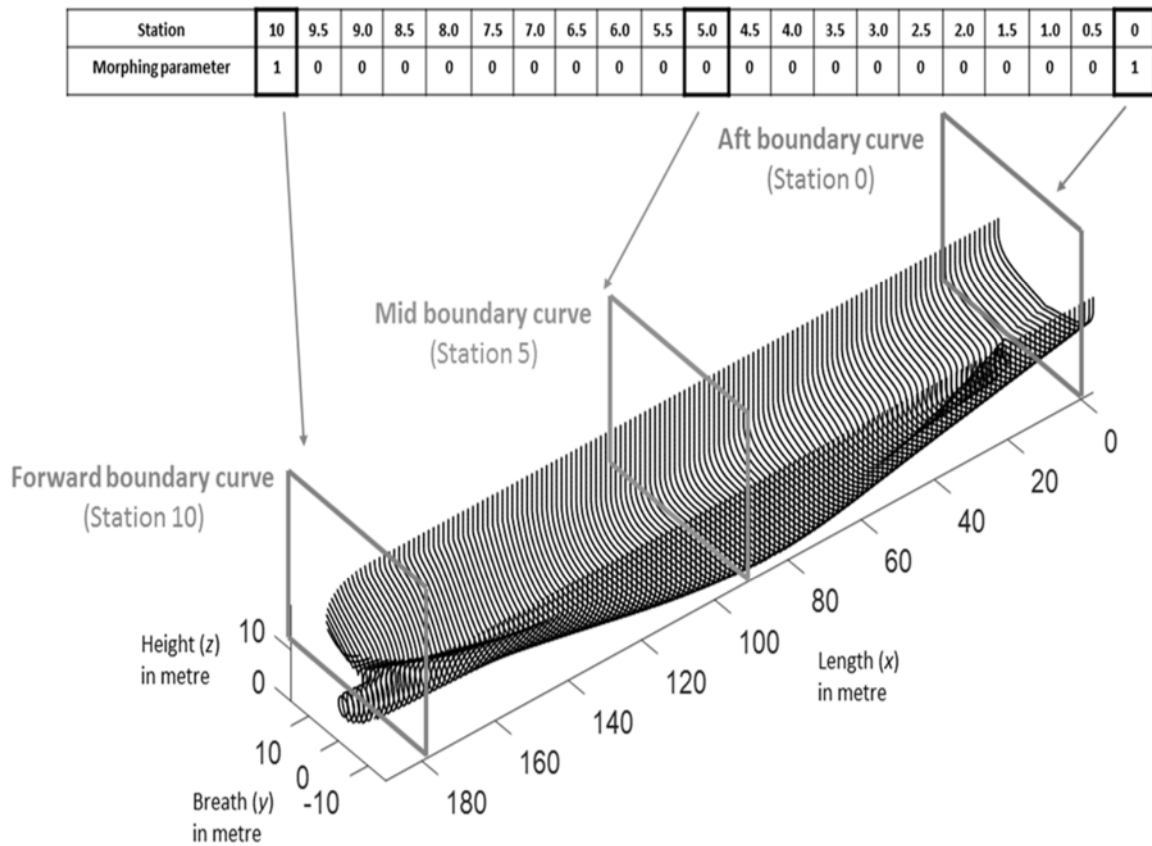


Figure 21

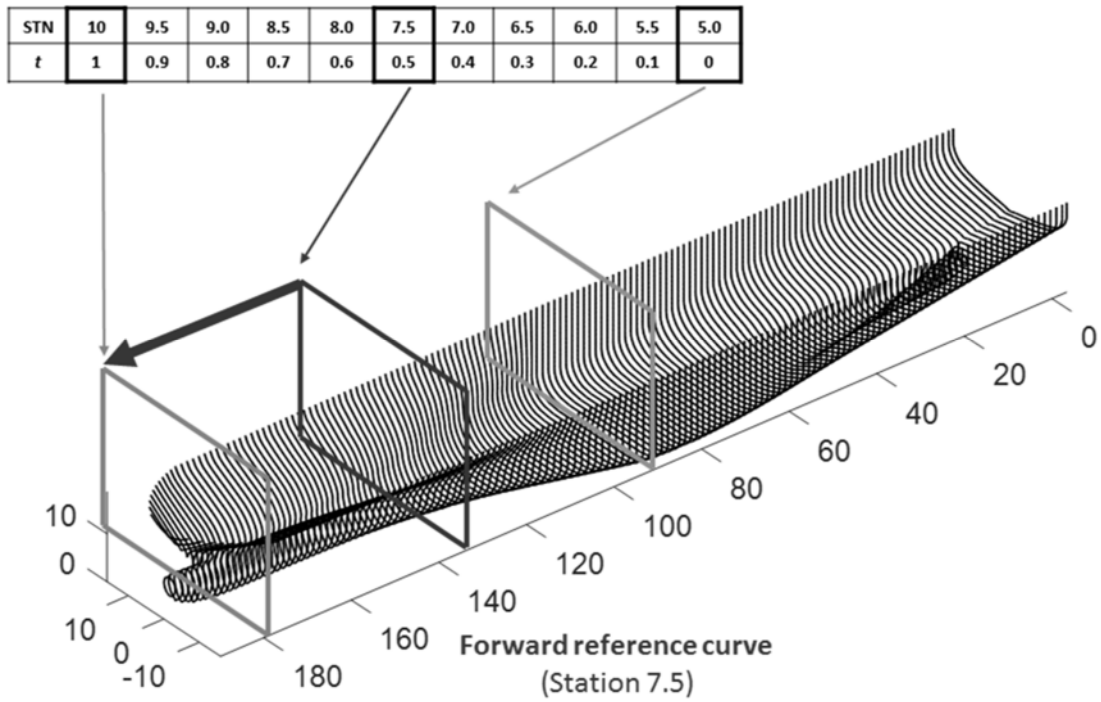


Figure 22(a)

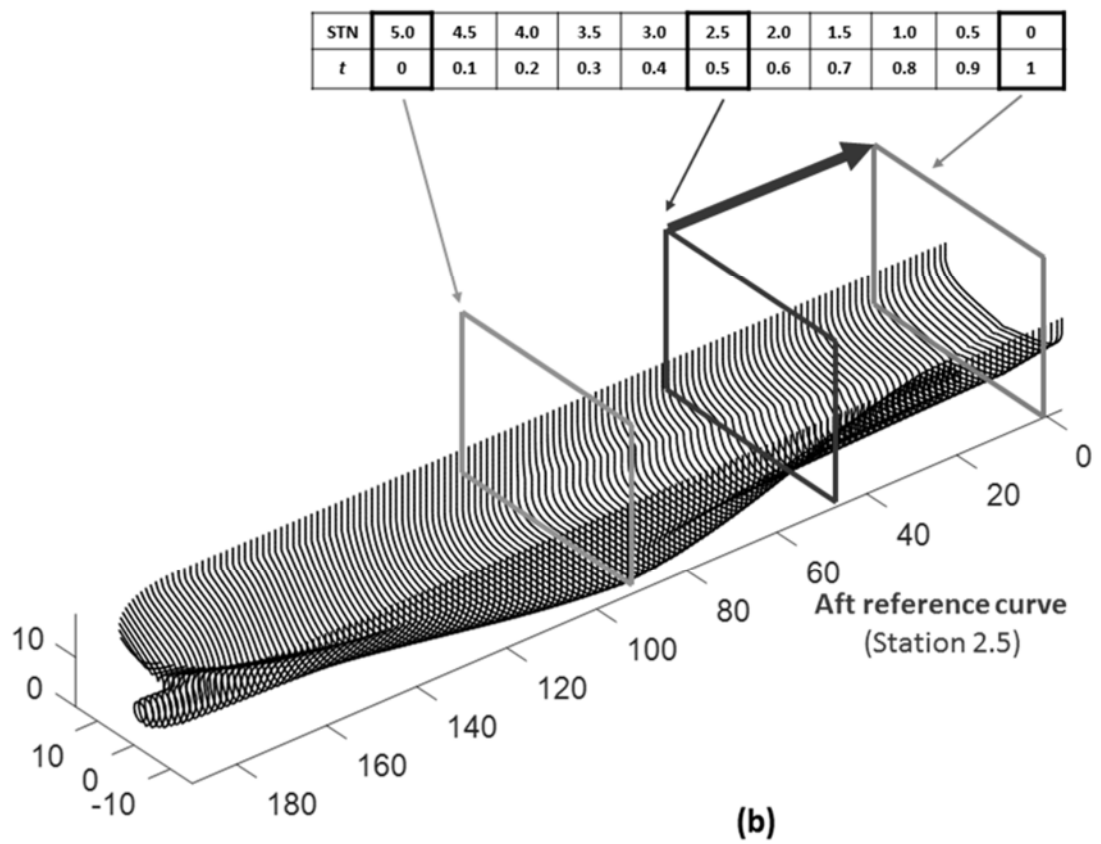


Figure 22(b)

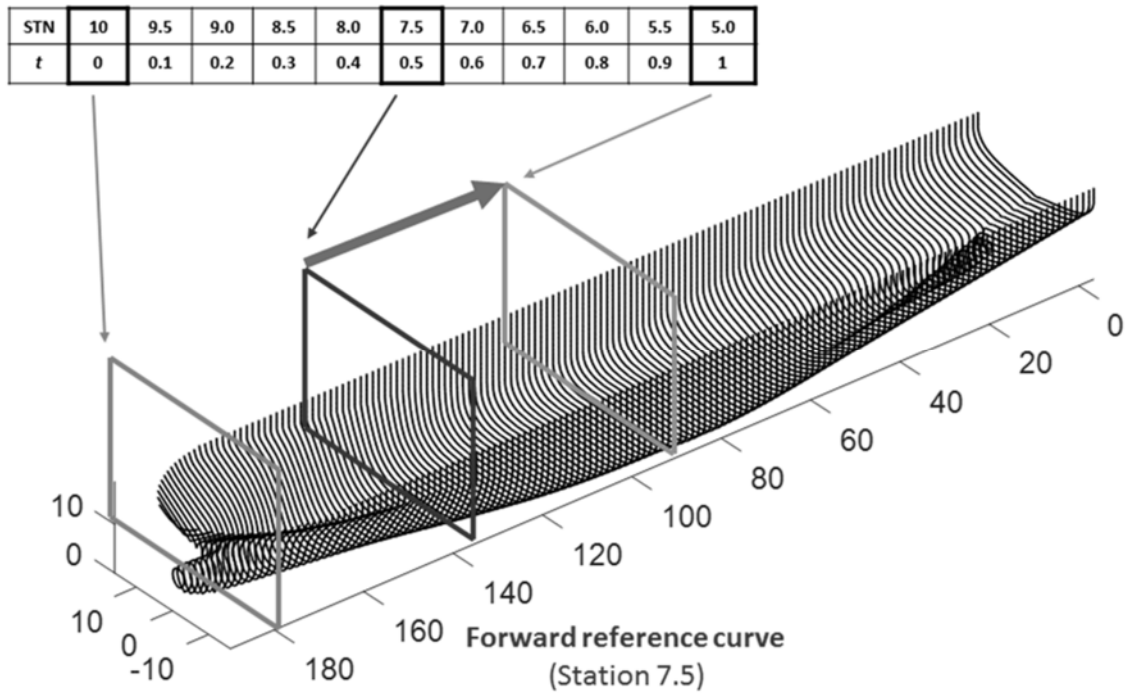


Figure 22(c)

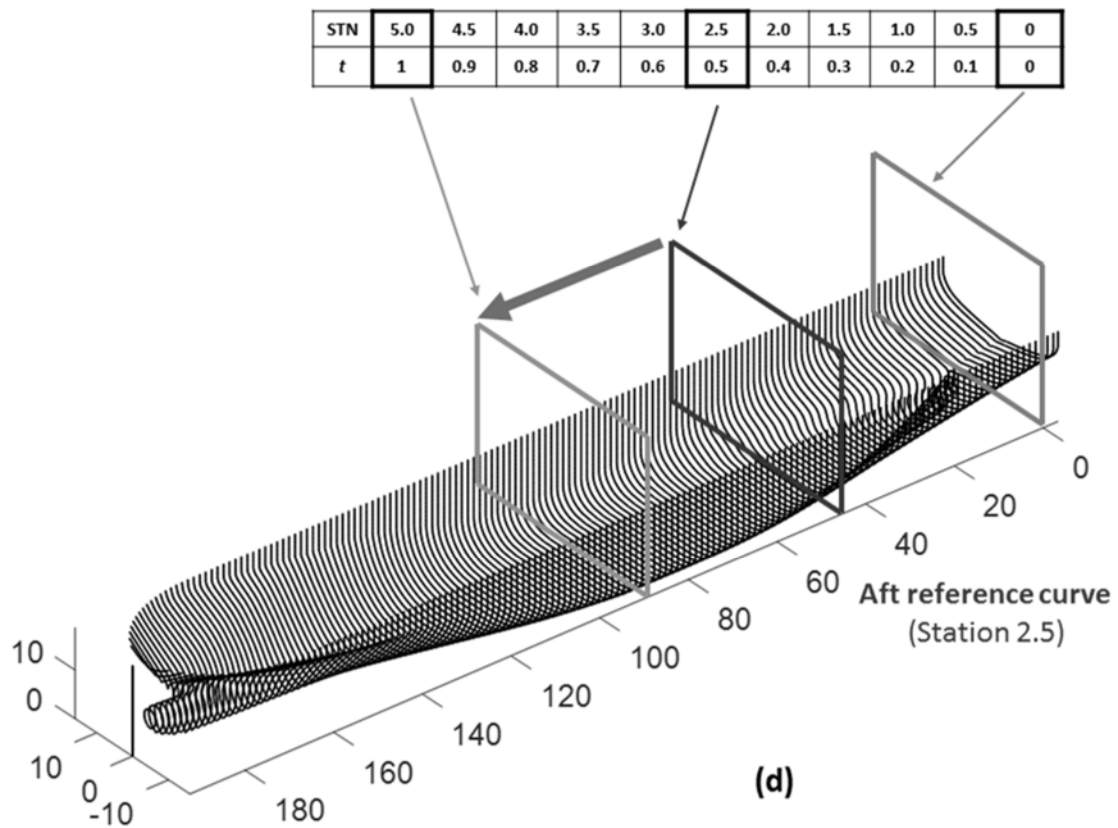


Figure 22(d)

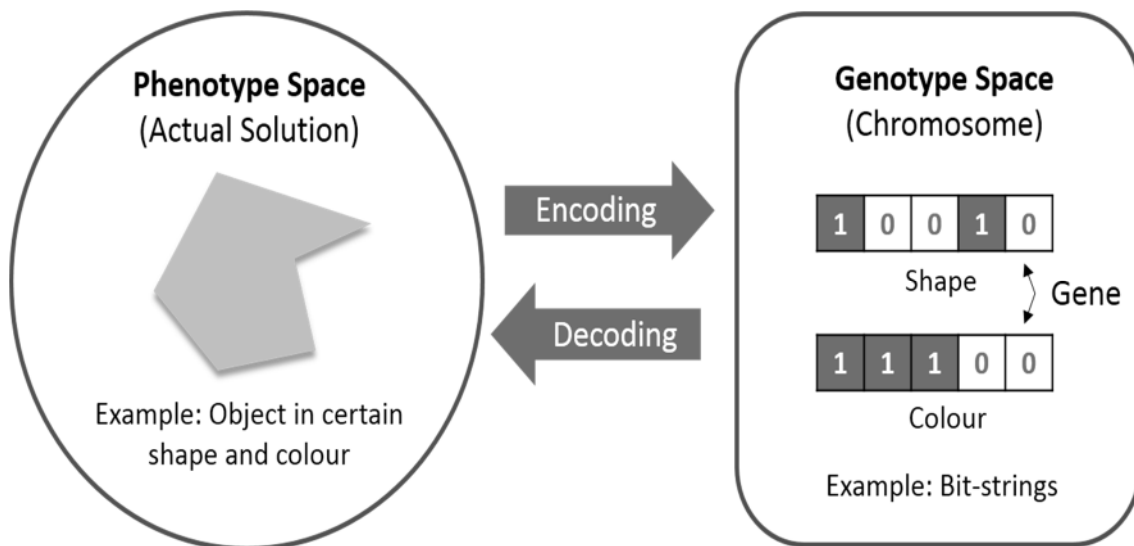


Figure 23

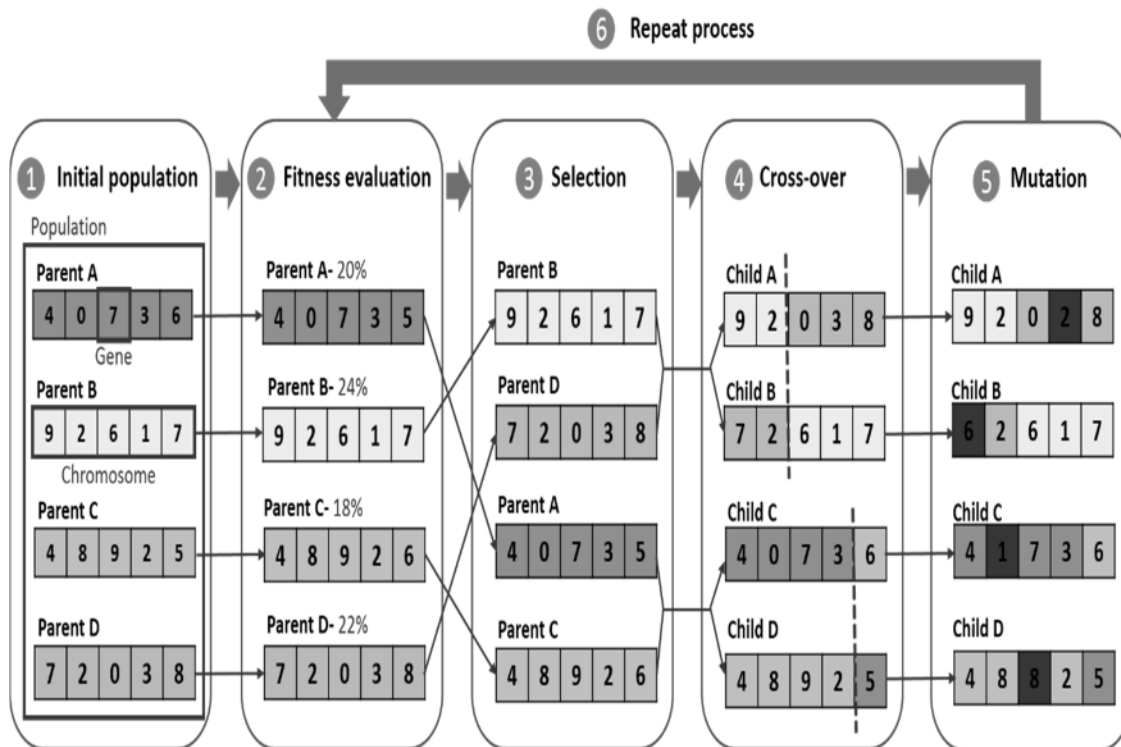


Figure 24

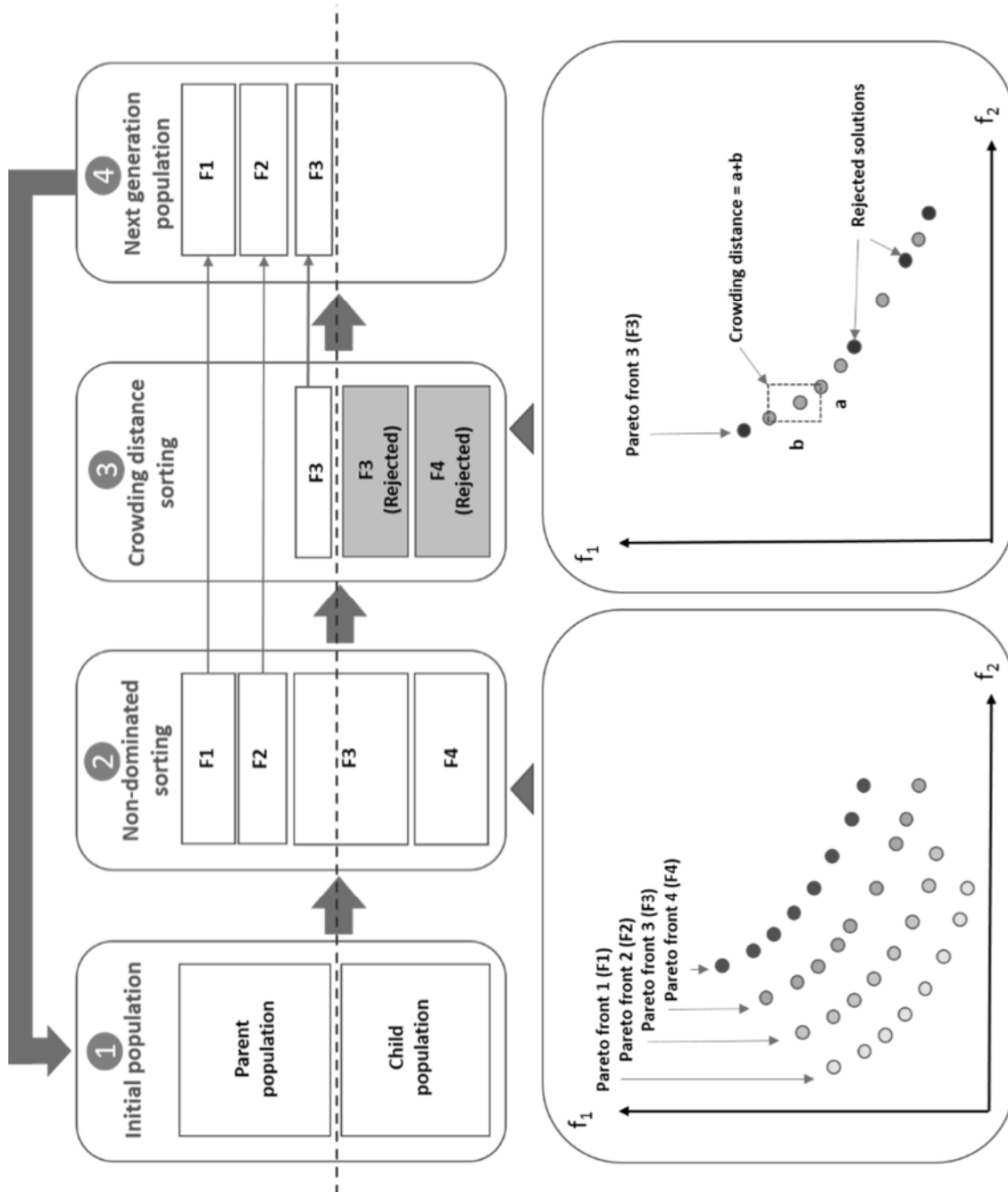


Figure 25

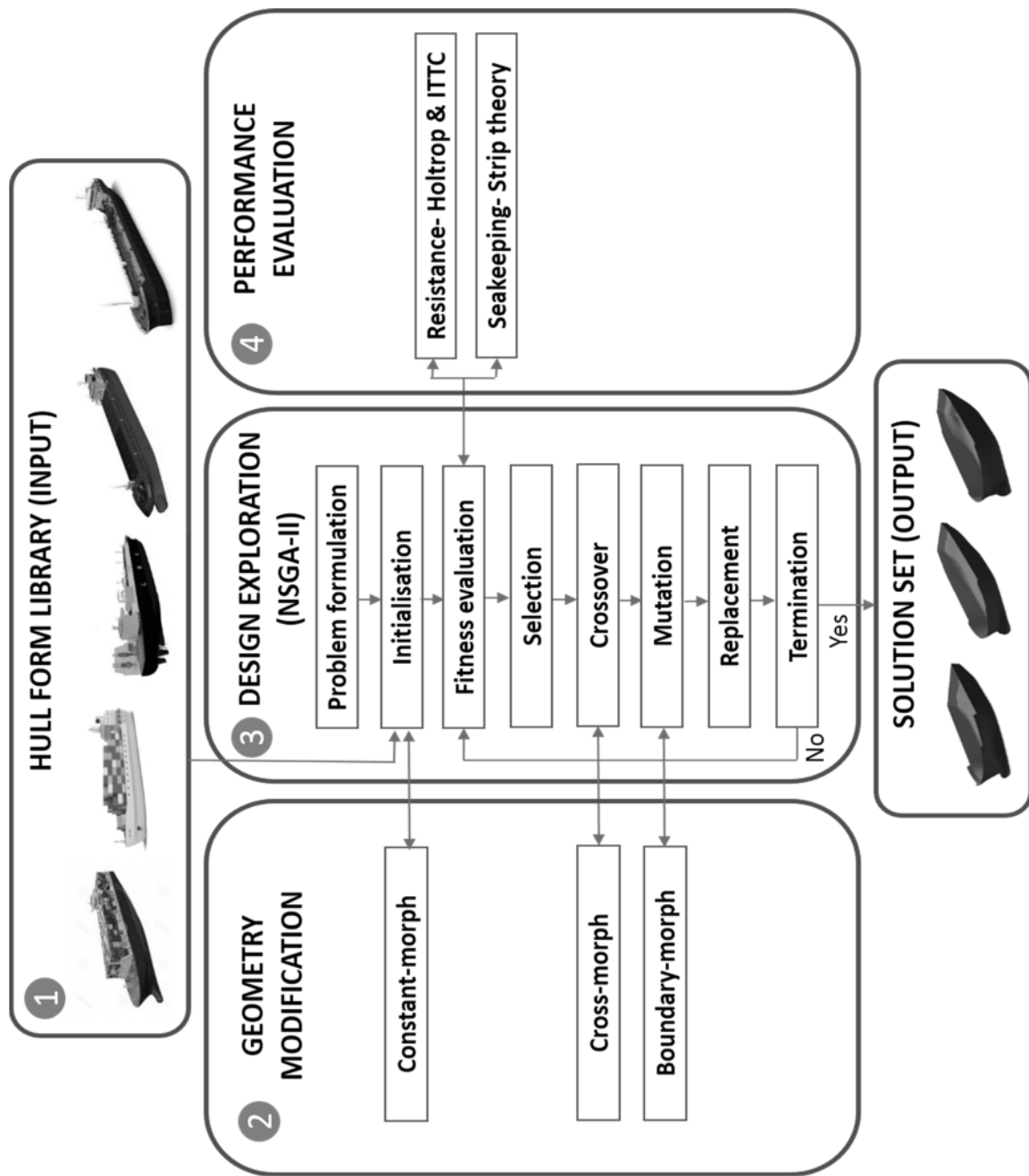


Figure 26

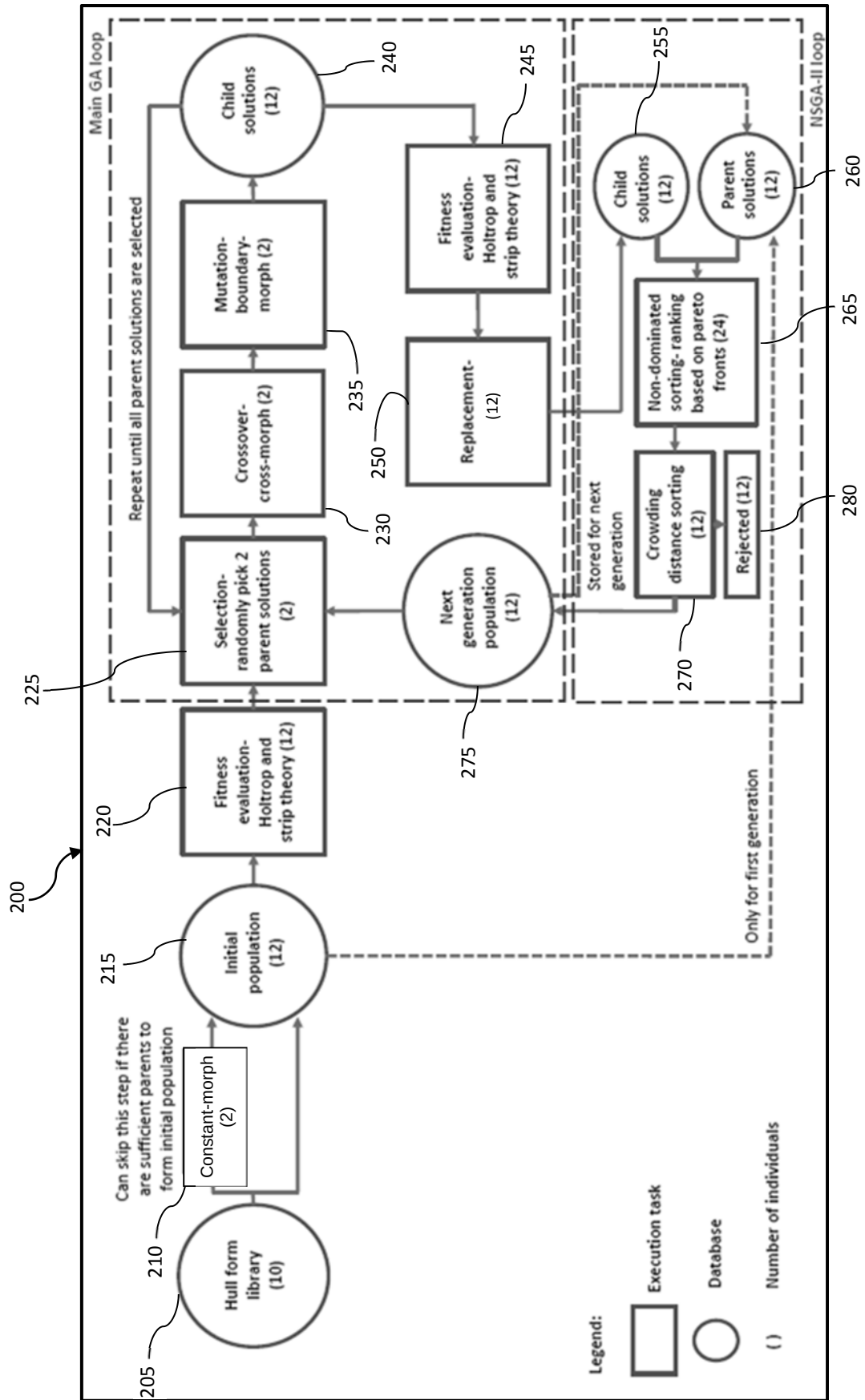


Figure 27

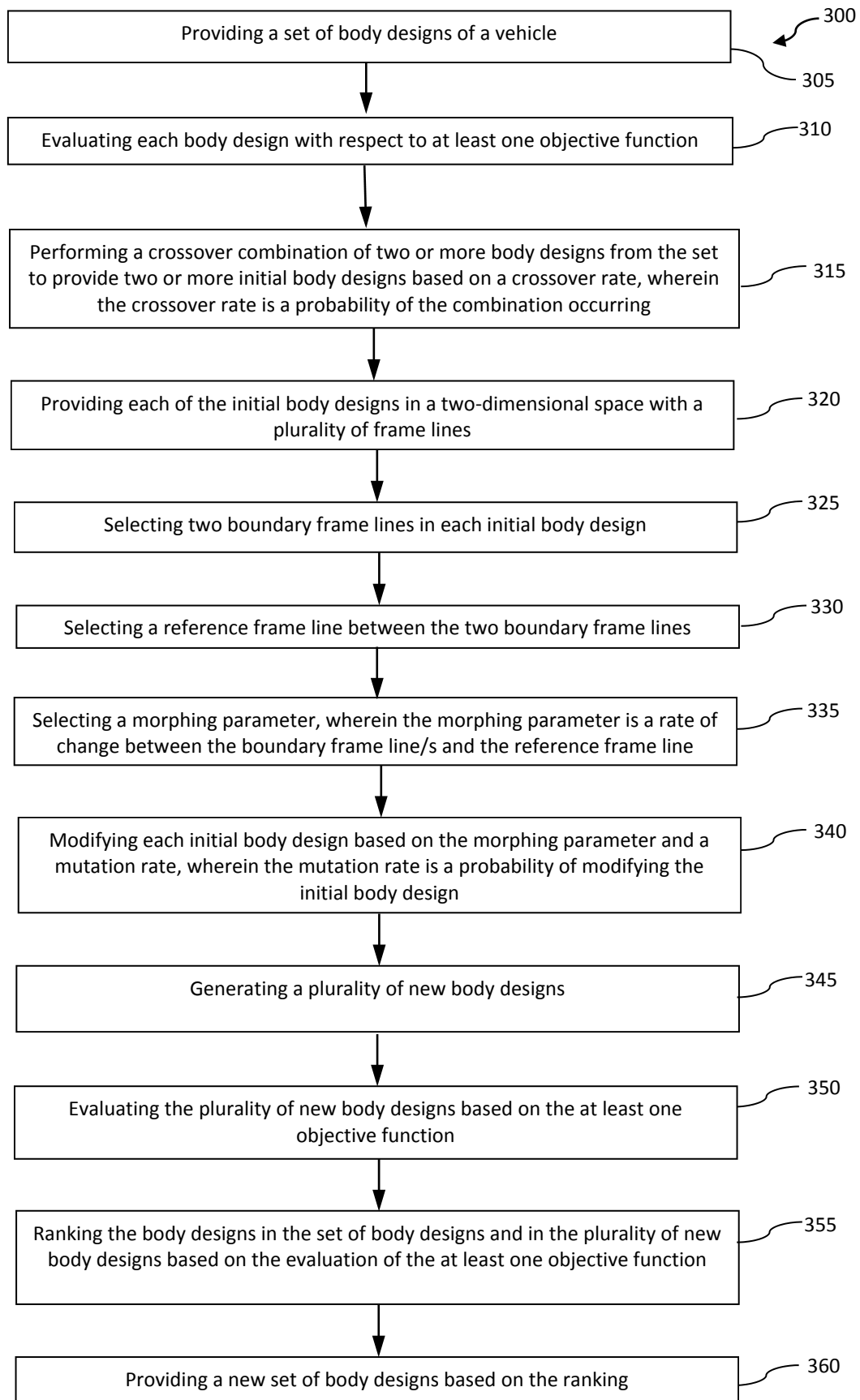


Figure 28

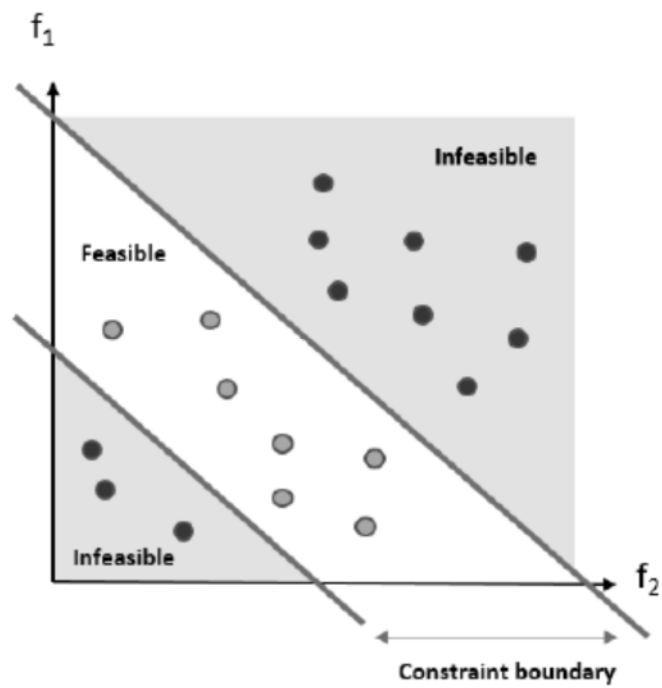


Figure 29

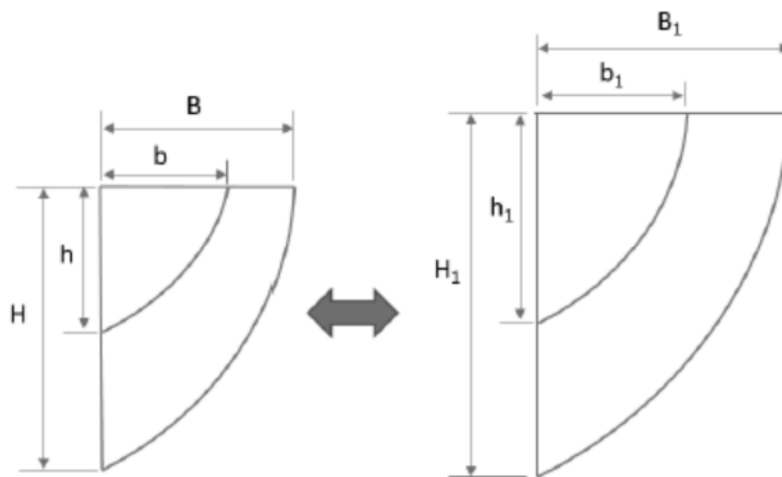


Figure 30

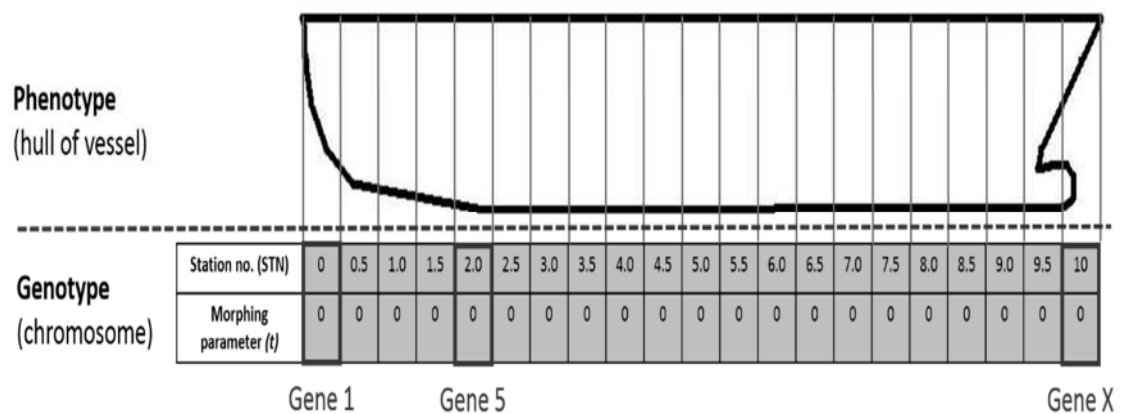


Figure 31

Combine parent and offspring population [P U Q]

Assign rank based on pareto dominance sorting algorithm

Calculate the crowding distance of individual in each front

Select the best N individual based on ranking and crowding distance

Figure 32

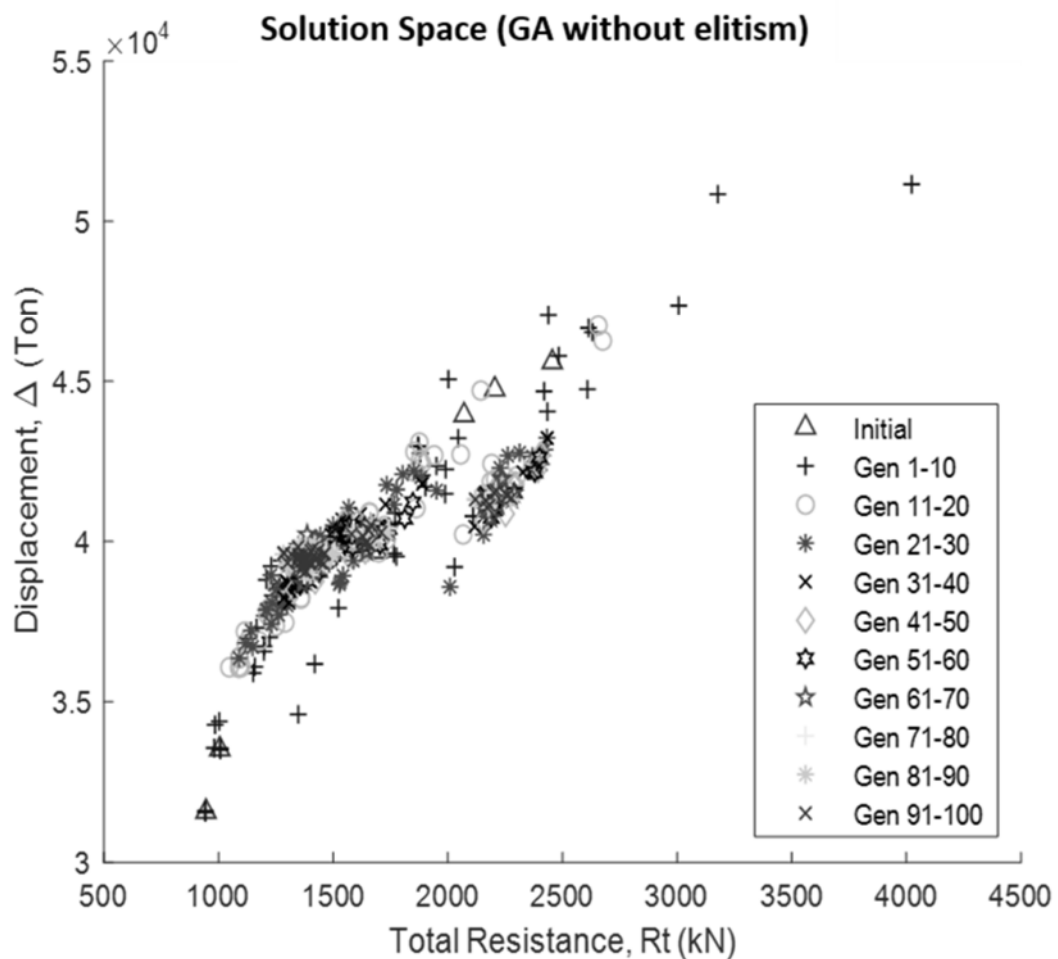


Figure 33(a)

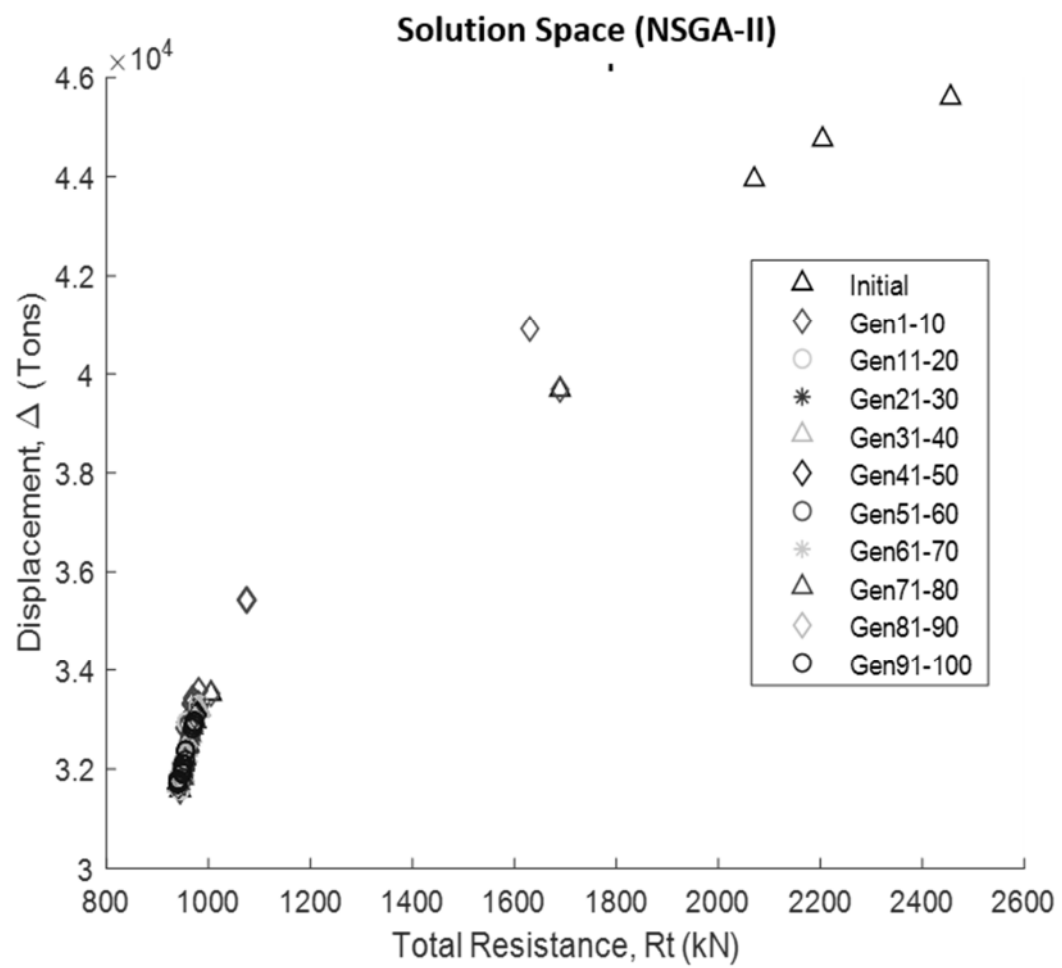


Figure 33(b)

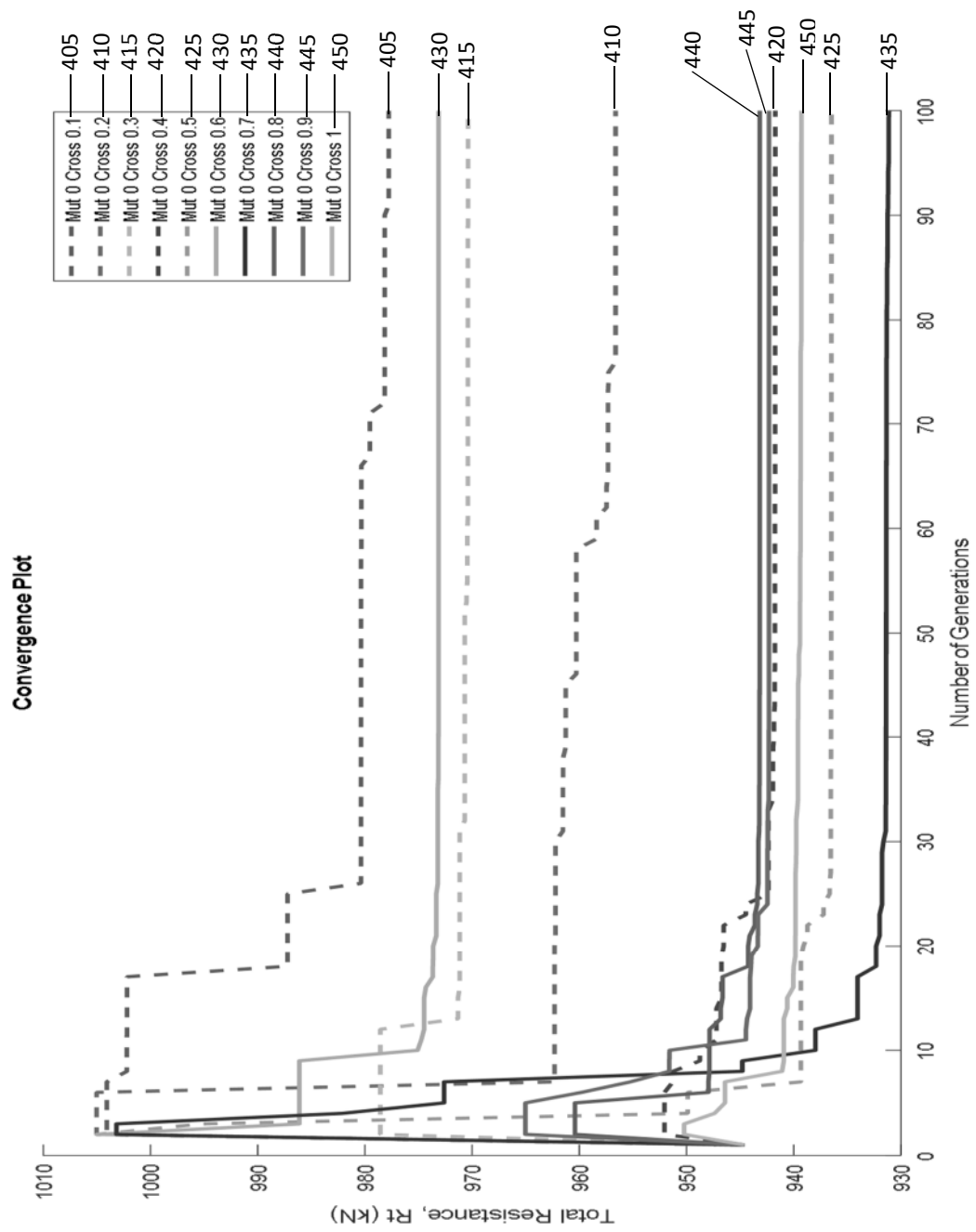


Figure 34

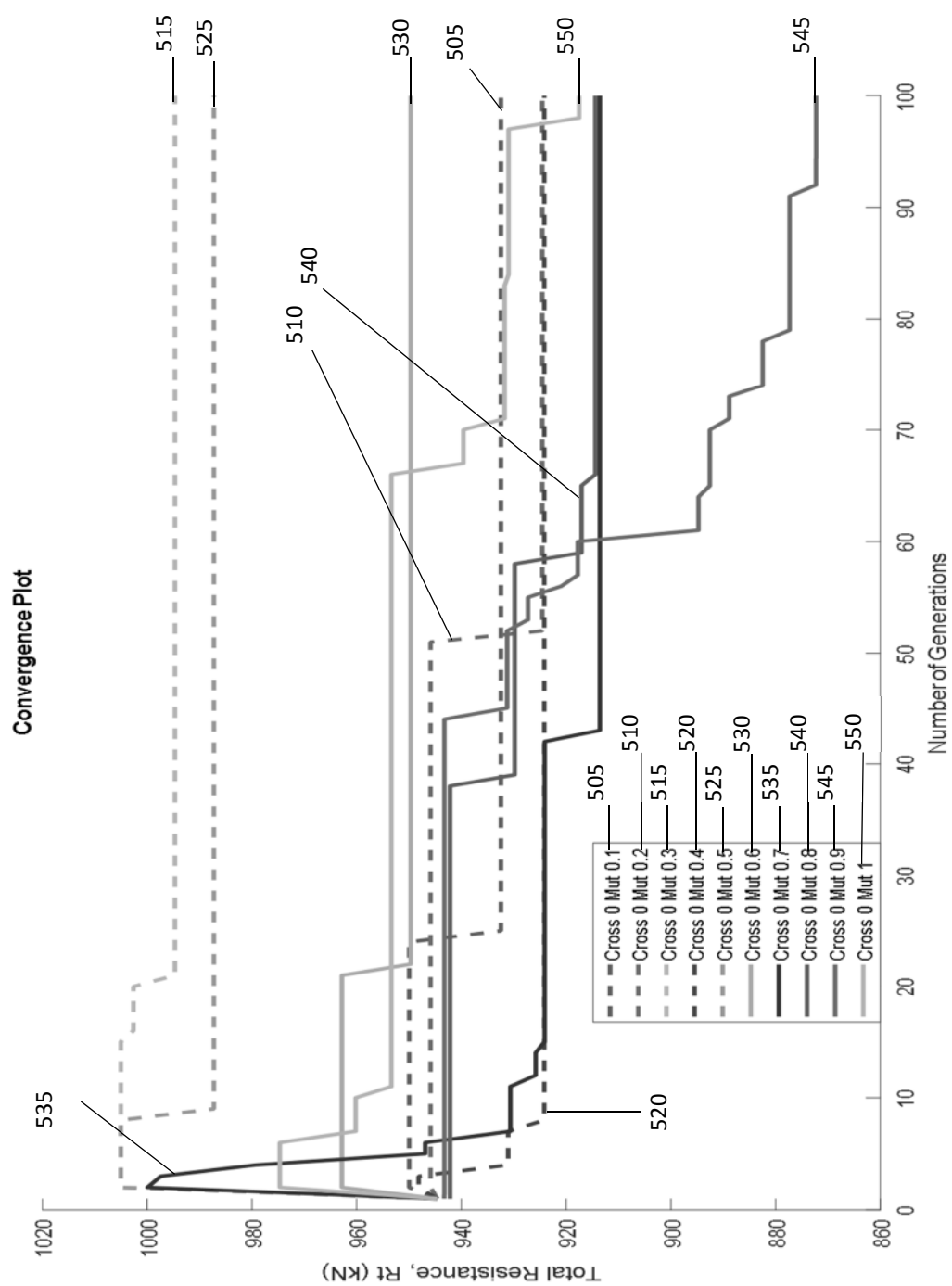
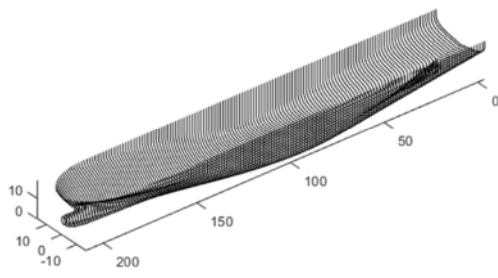


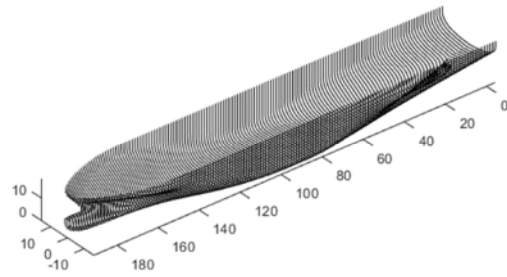
Figure 35

Ship 1- Container Ship A



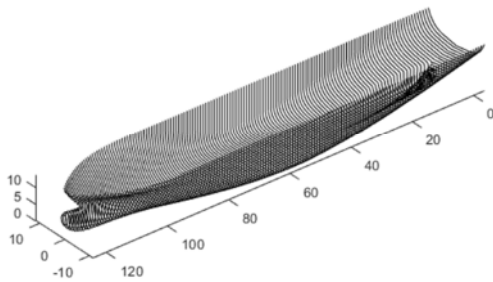
(a)

Ship 2- Container Ship B



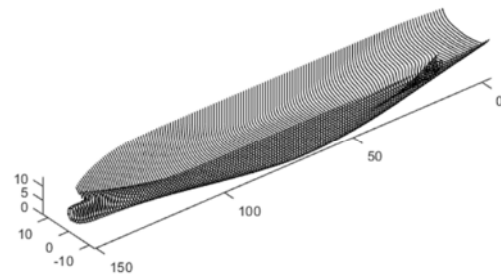
(b)

Ship 3- Container Ship C



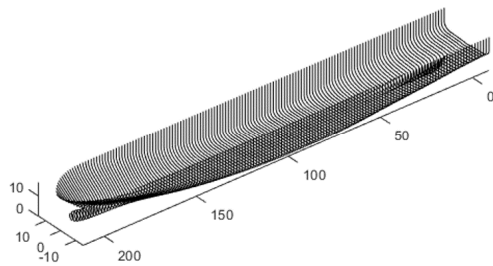
(c)

Ship 4- Container Ship D



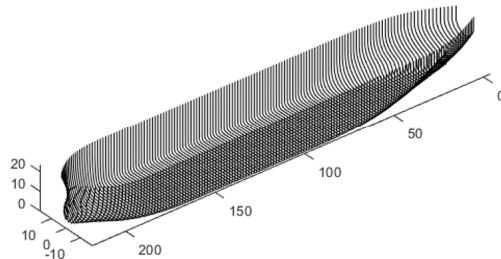
(d)

Ship 5- ROPAX



(e)

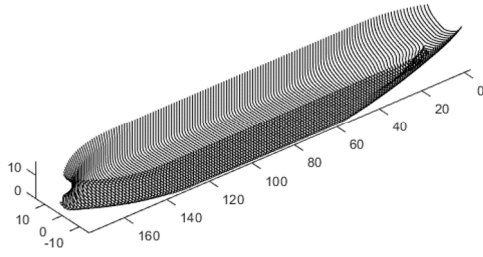
Ship 6- Bulk Carrier



(f)

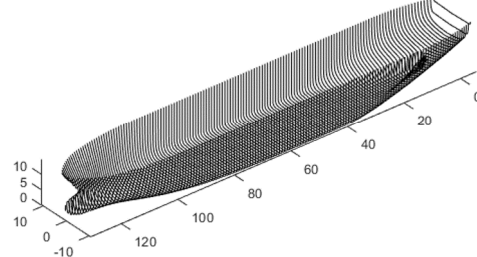
Figure 36A

Ship 7- Product Tanker



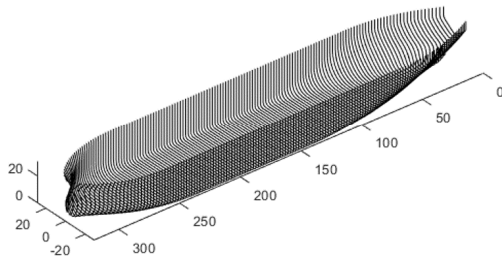
(g)

Ship 8- Chemical Tanker



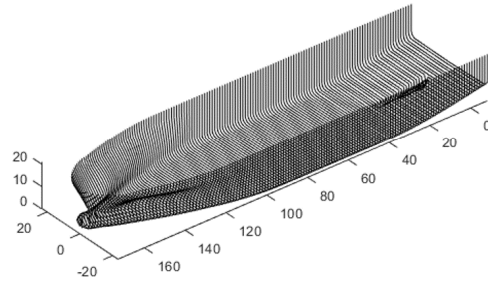
(h)

Ship 9- VLCC



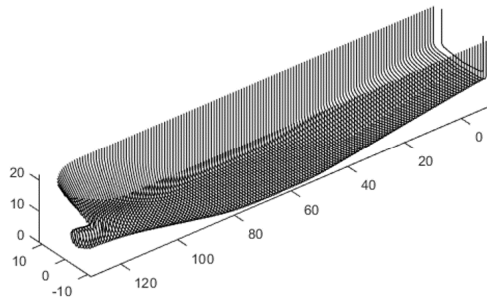
(i)

Ship 10- Pipe-laying Ship



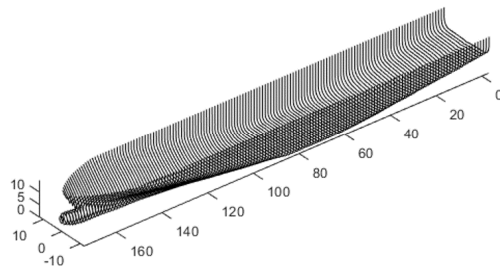
(j)

Ship 11- Cable-laying Ship



(k)

Ship 12- Offshore Accommodation Ship



(l)

Figure 36B

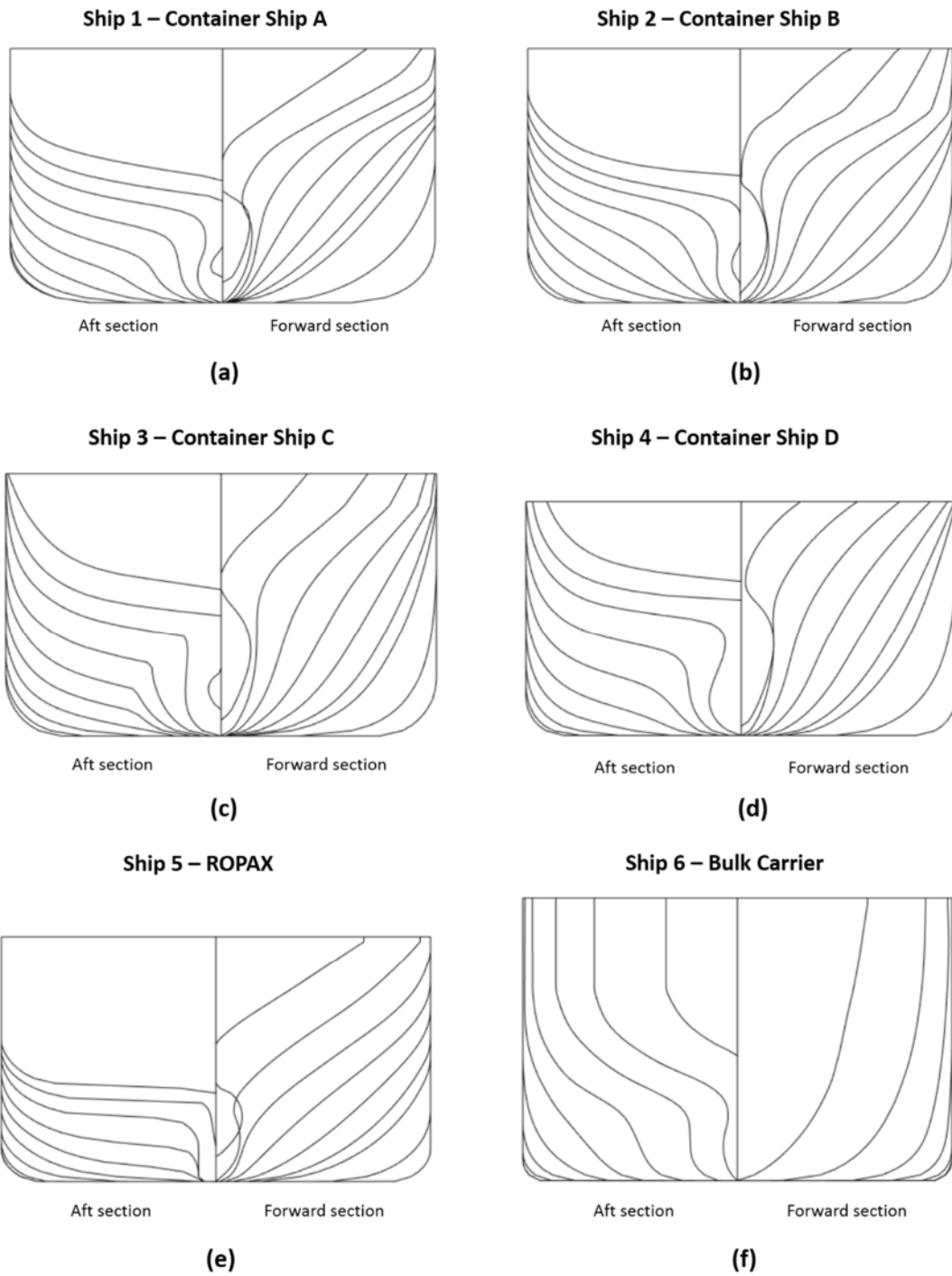
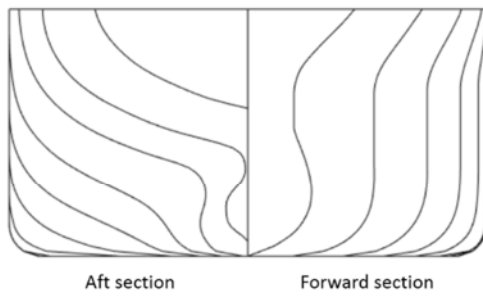


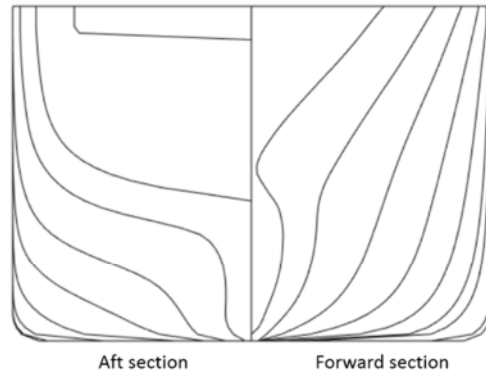
Figure 37A

Ship 7 – Product Tanker



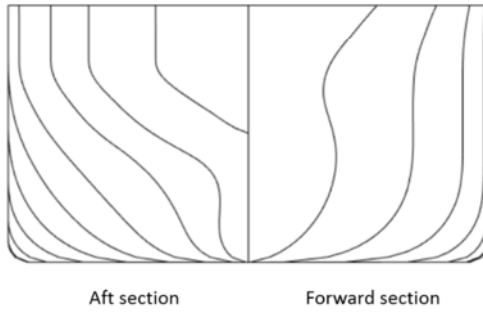
(g)

Ship 8 – Chemical Tanker



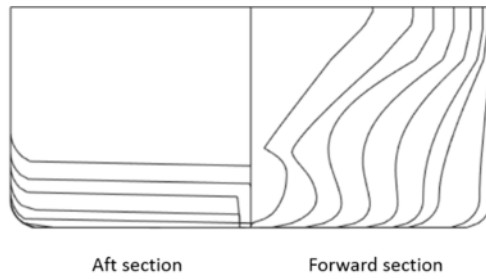
(h)

Ship 9 – VLCC



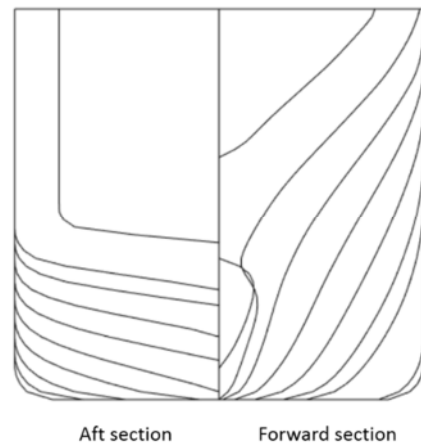
(i)

Ship 10 – Pipe-lay Ship



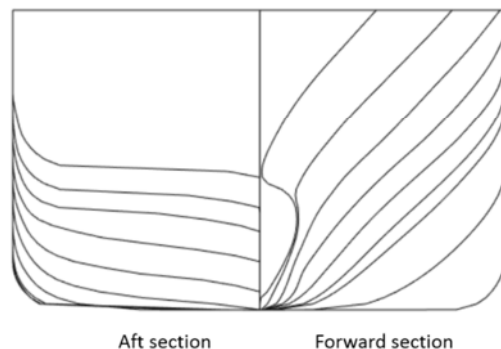
(j)

Ship 11 – Cable-laying Ship



(k)

Ship 12 – Offshore Accommodation Ship



(l)

Figure 37B

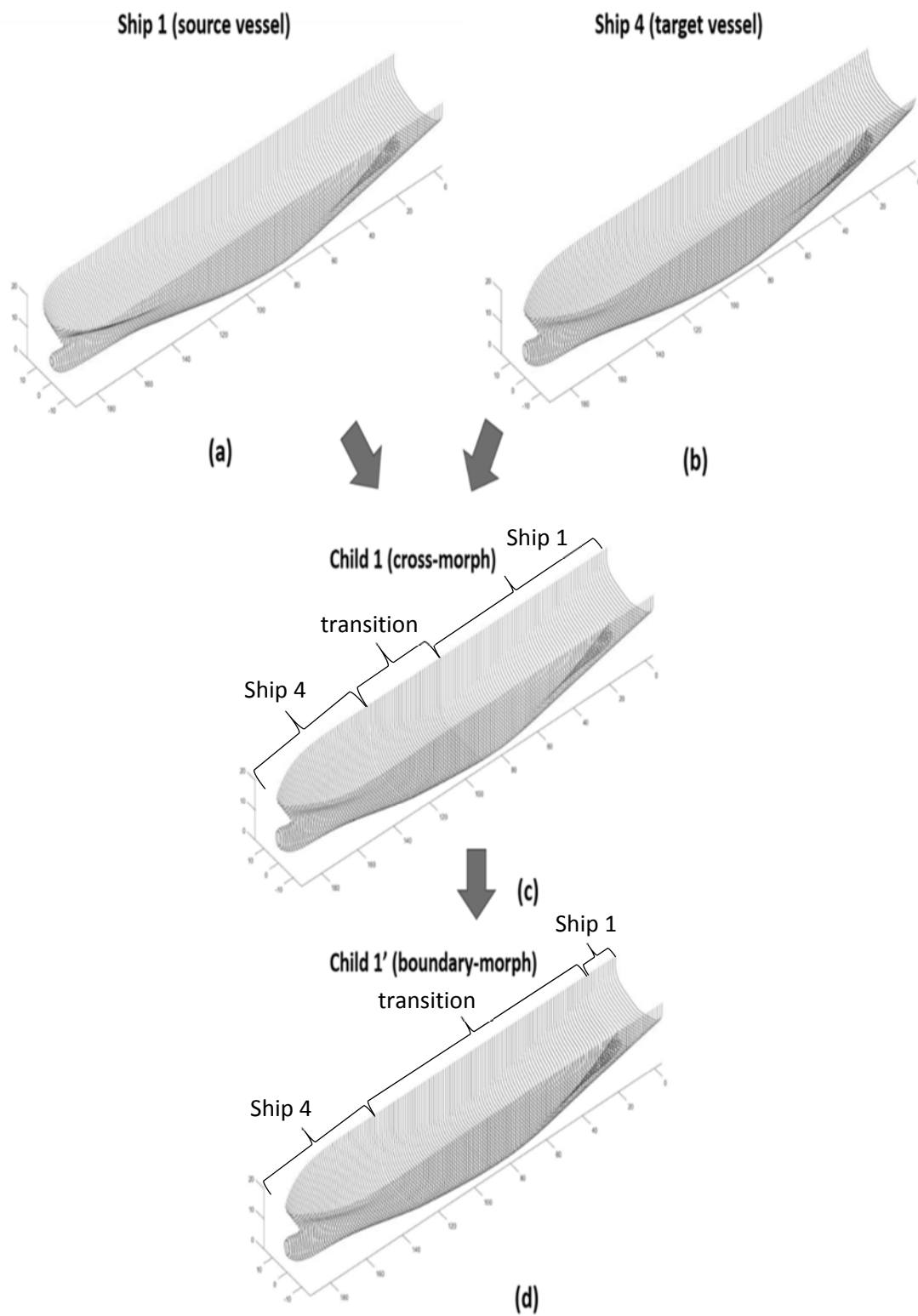


Figure 38

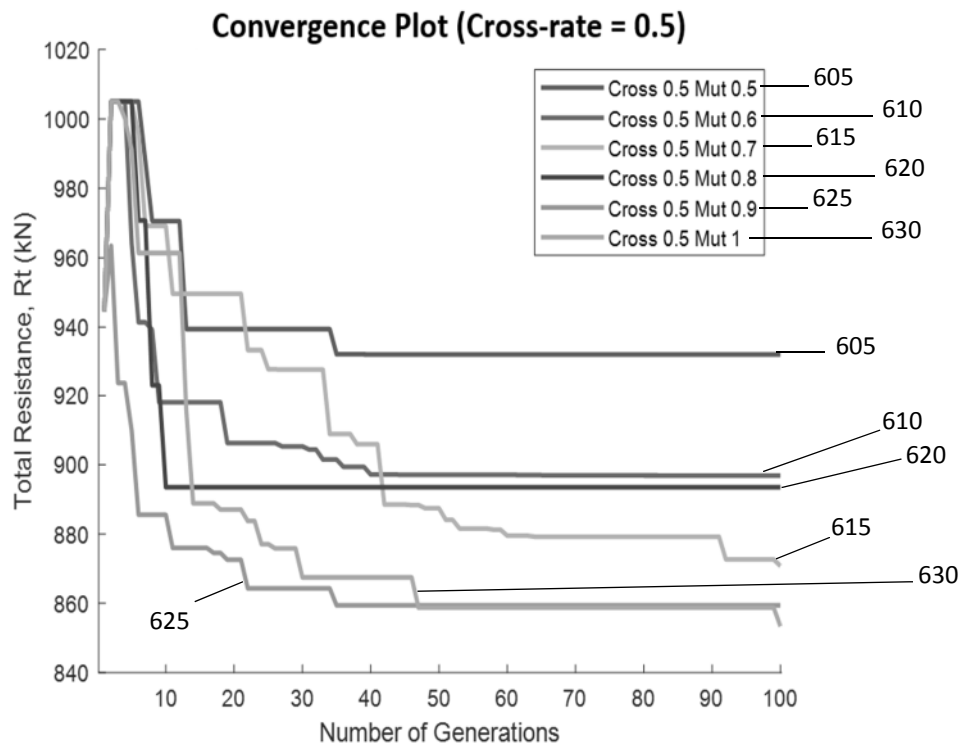


Figure 39(a)

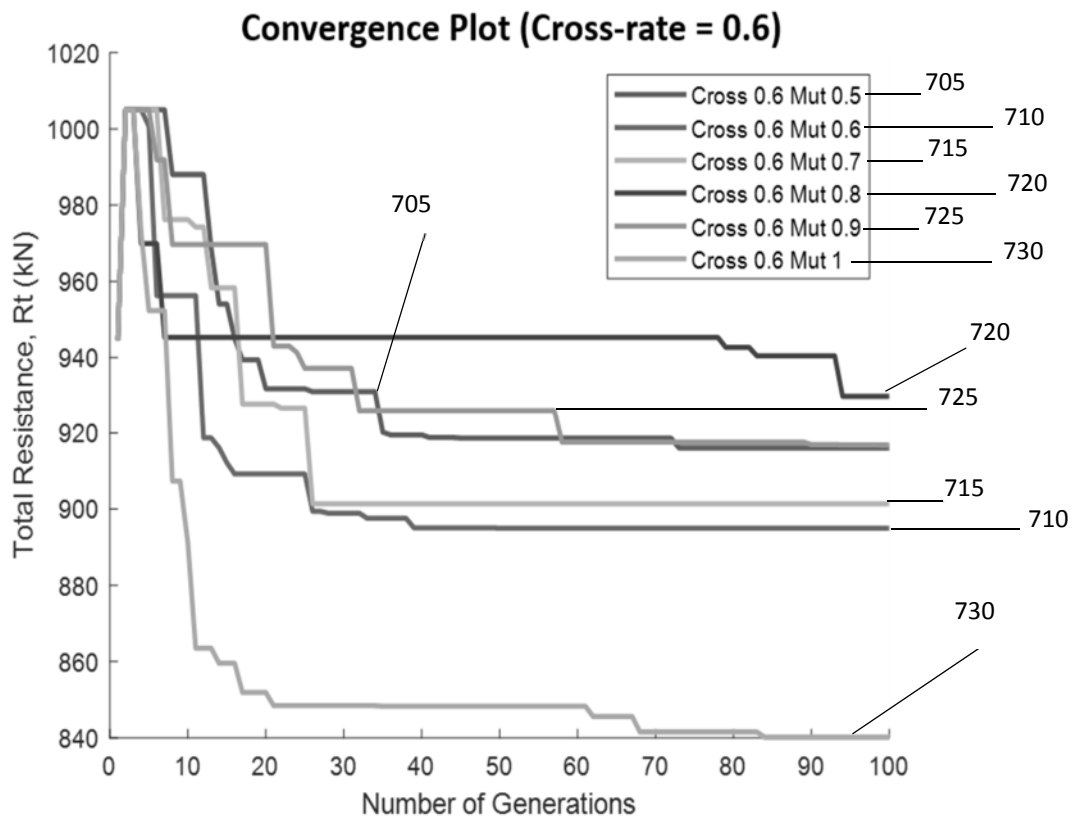


Figure 39(b)

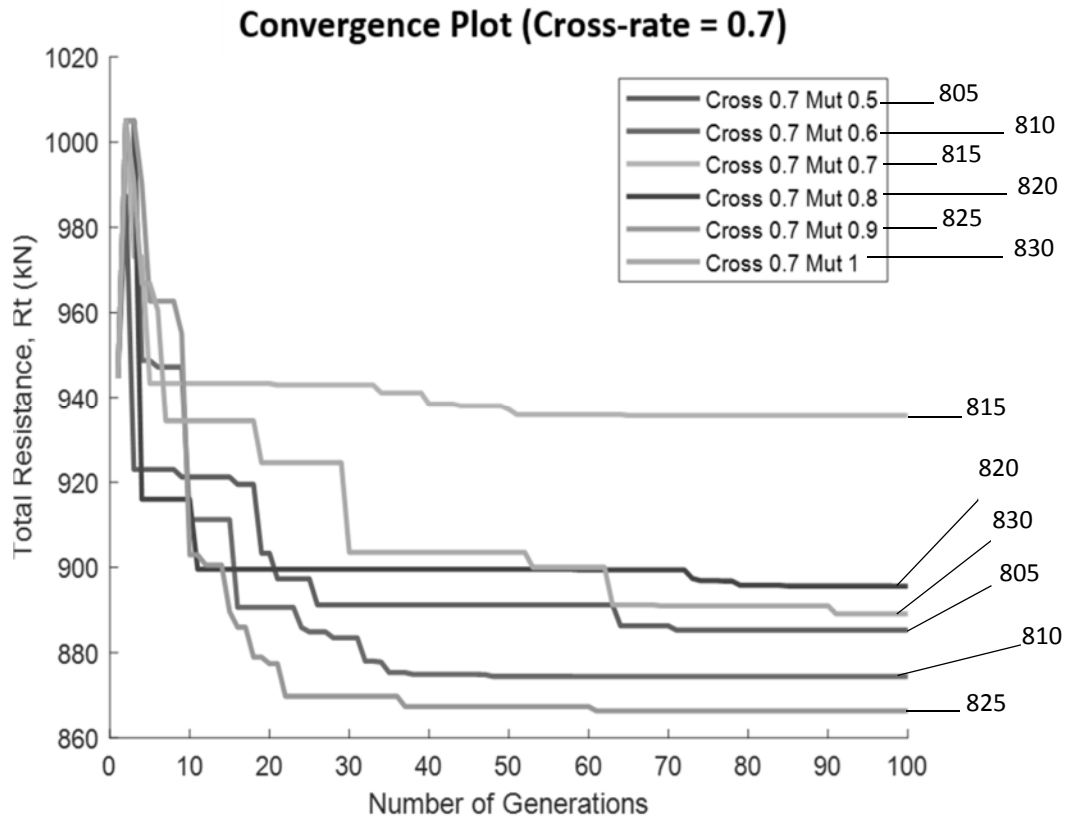


Figure 39(c)

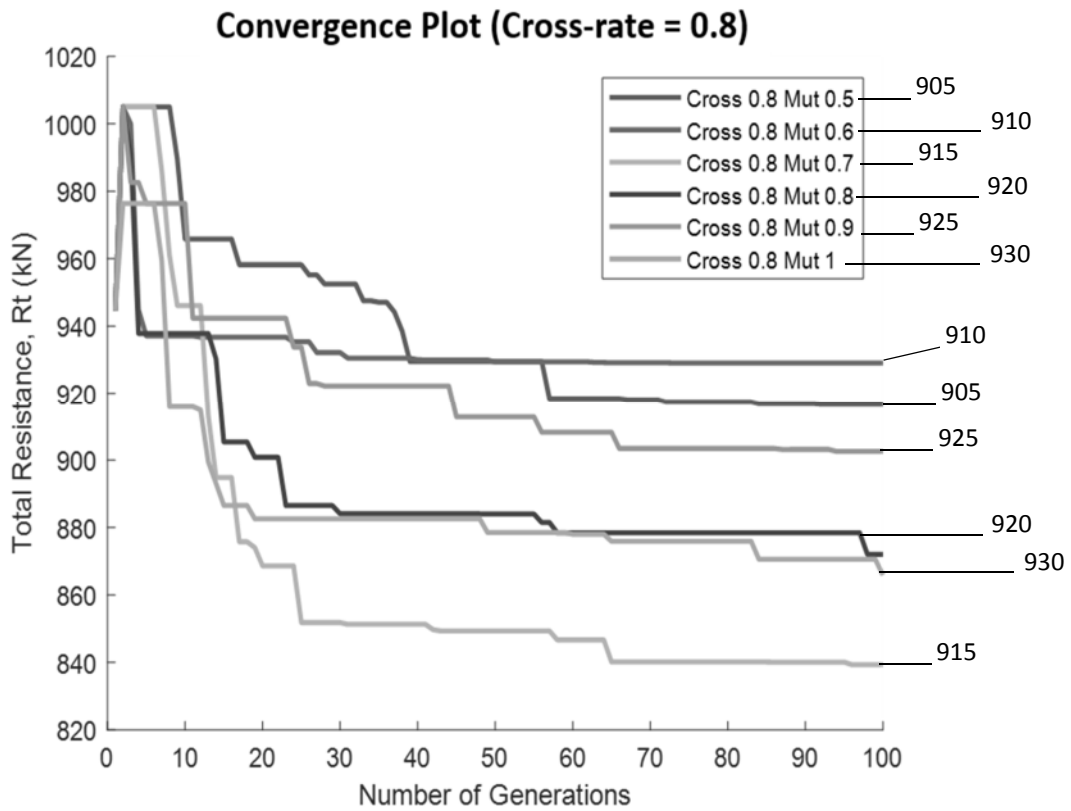


Figure 39 (d)

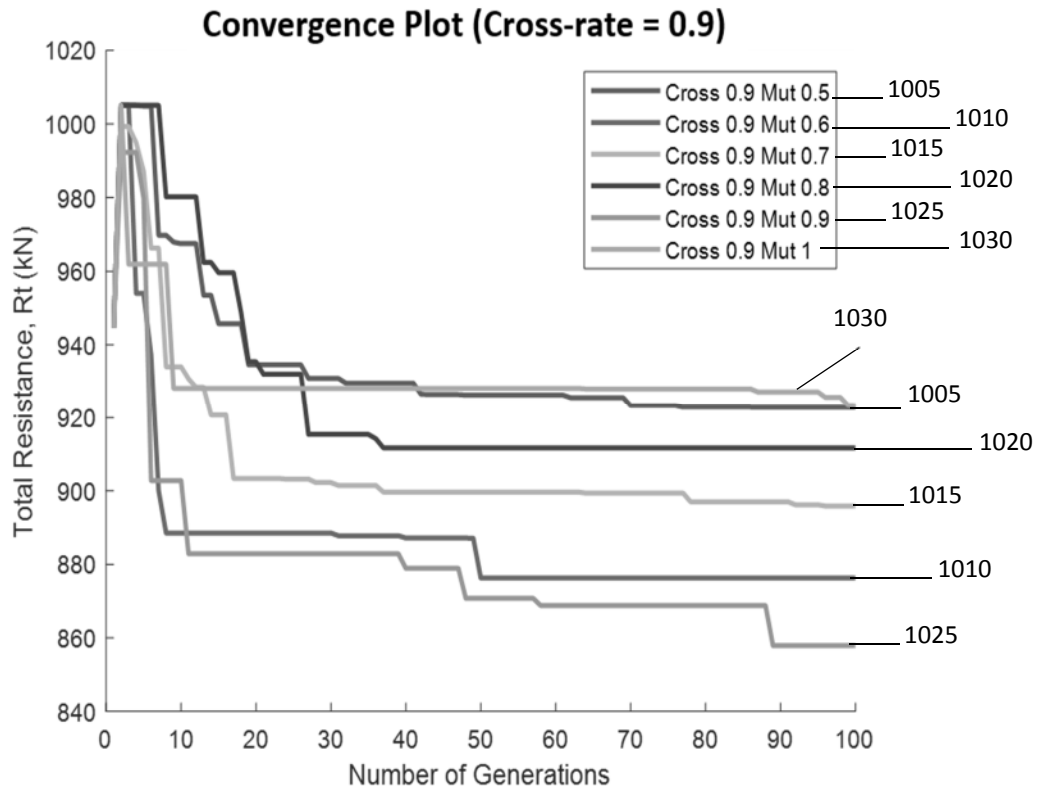


Figure 39(e)

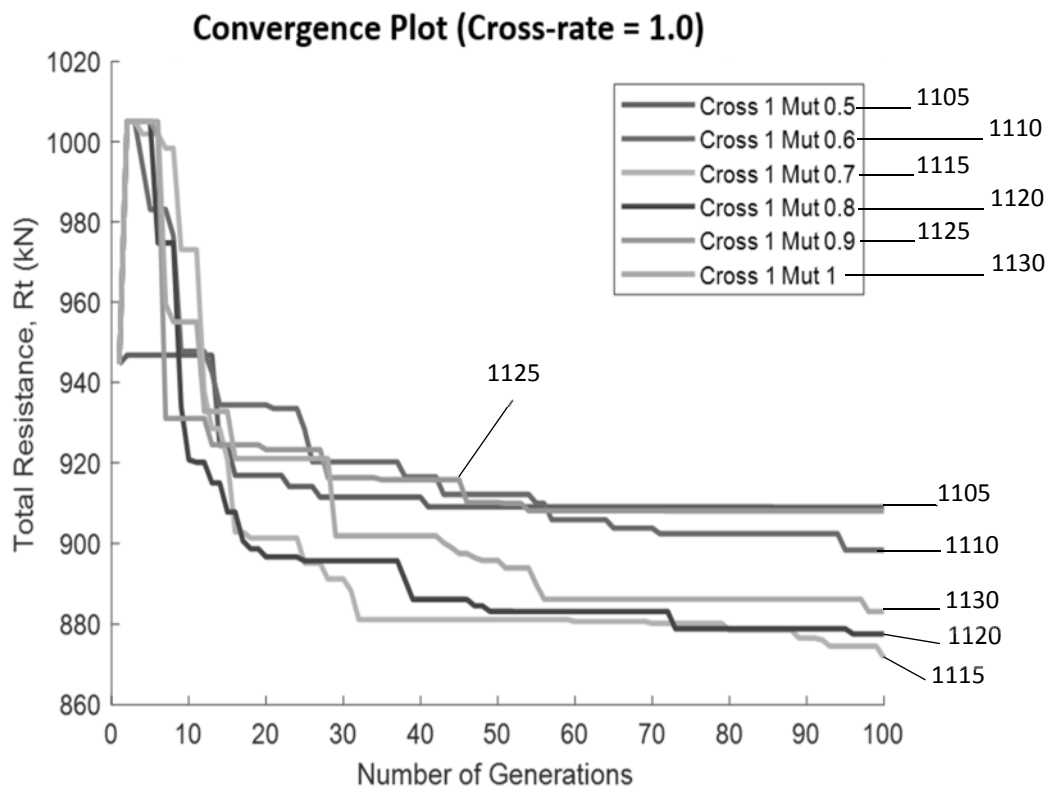


Figure 39(f)

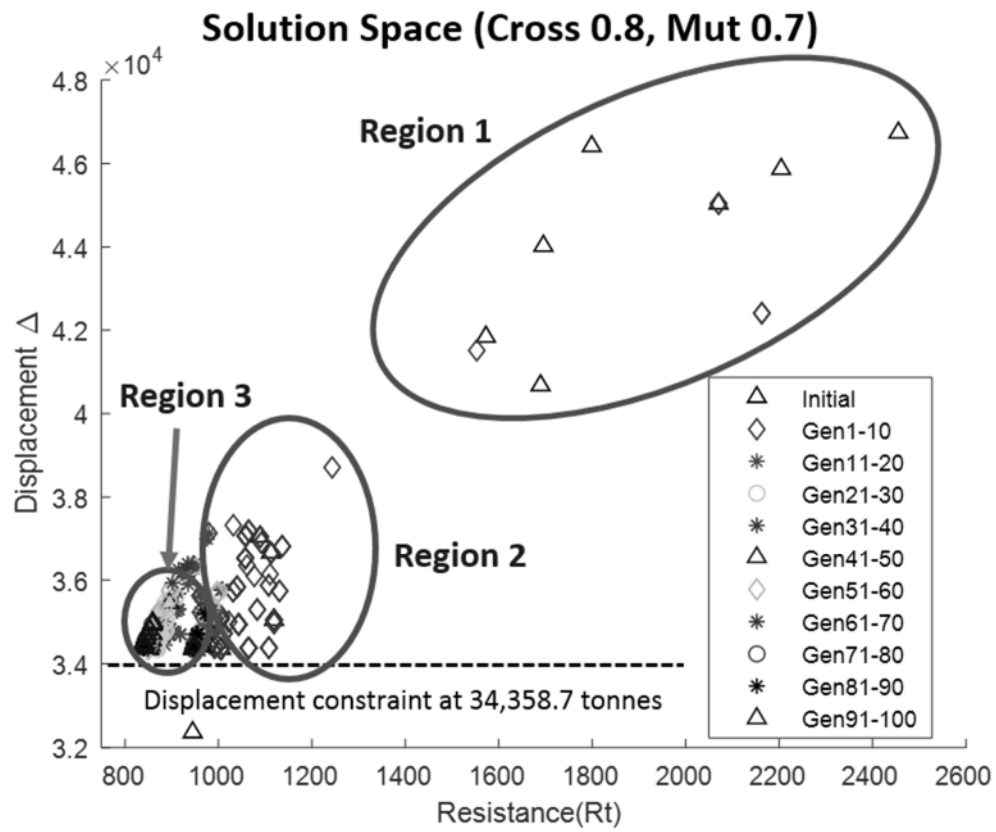
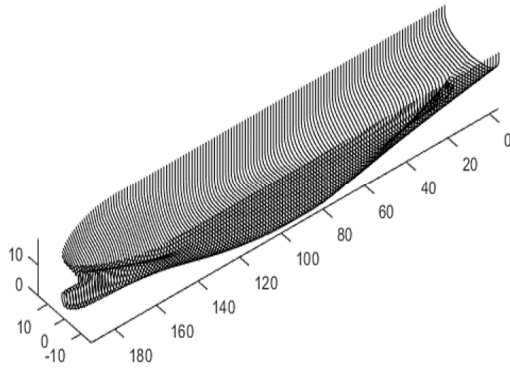


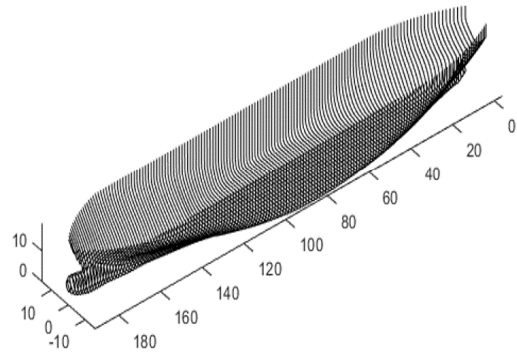
Figure 40

1st Generation



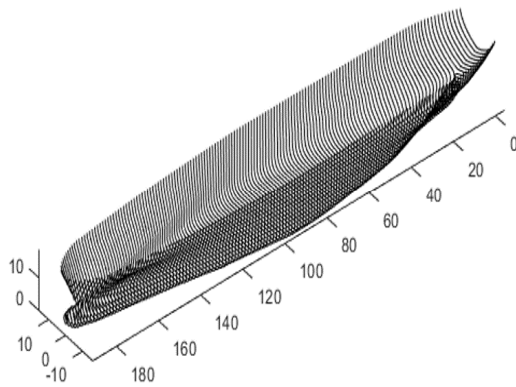
(a)

5th Generation



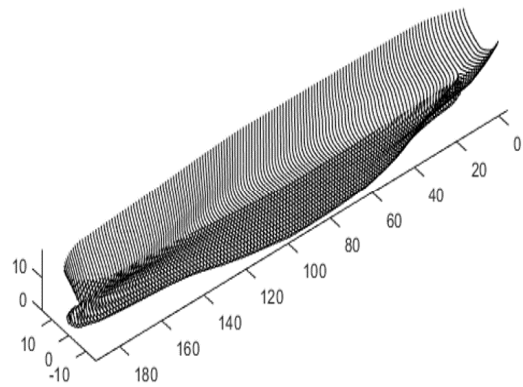
(b)

10th Generation



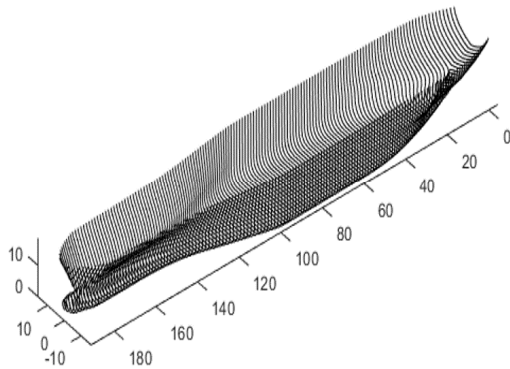
(c)

20th Generation



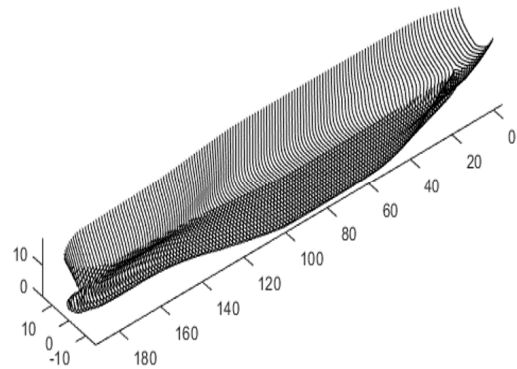
(d)

50th Generation



(e)

100th Generation



(f)

Figure 41
35 / 82

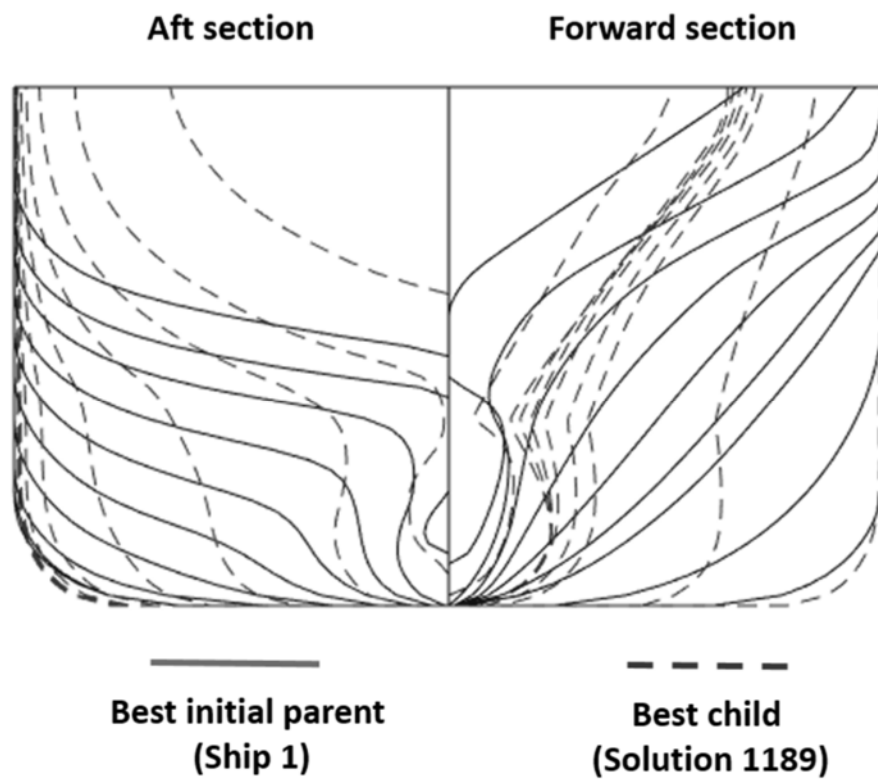


Figure 42

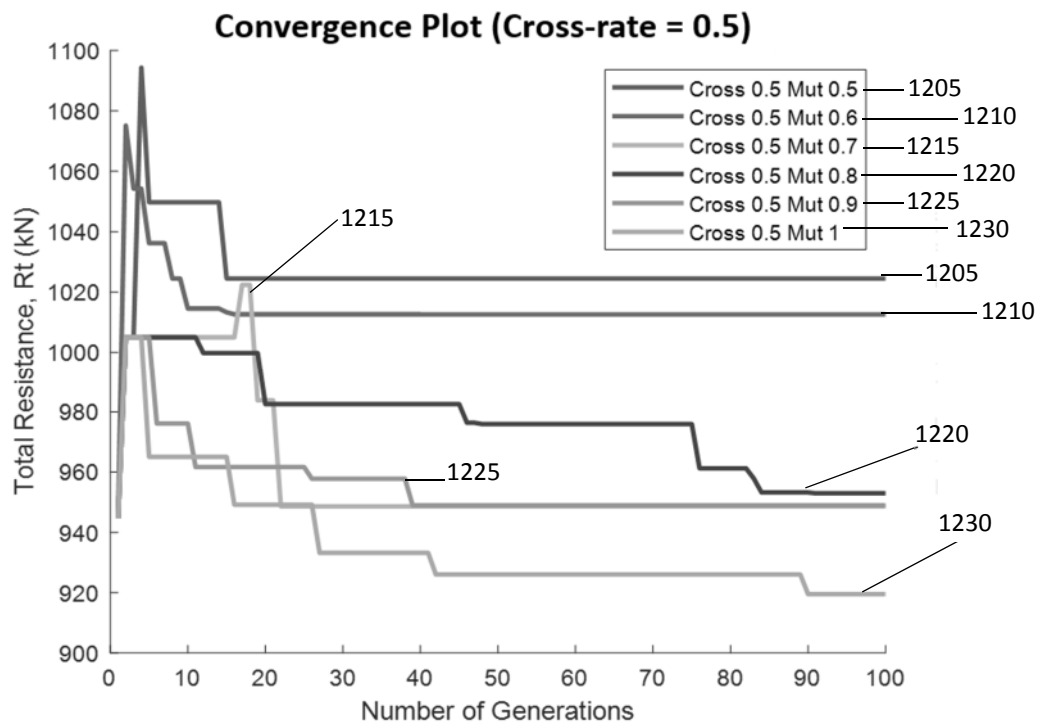


Figure 43(a)

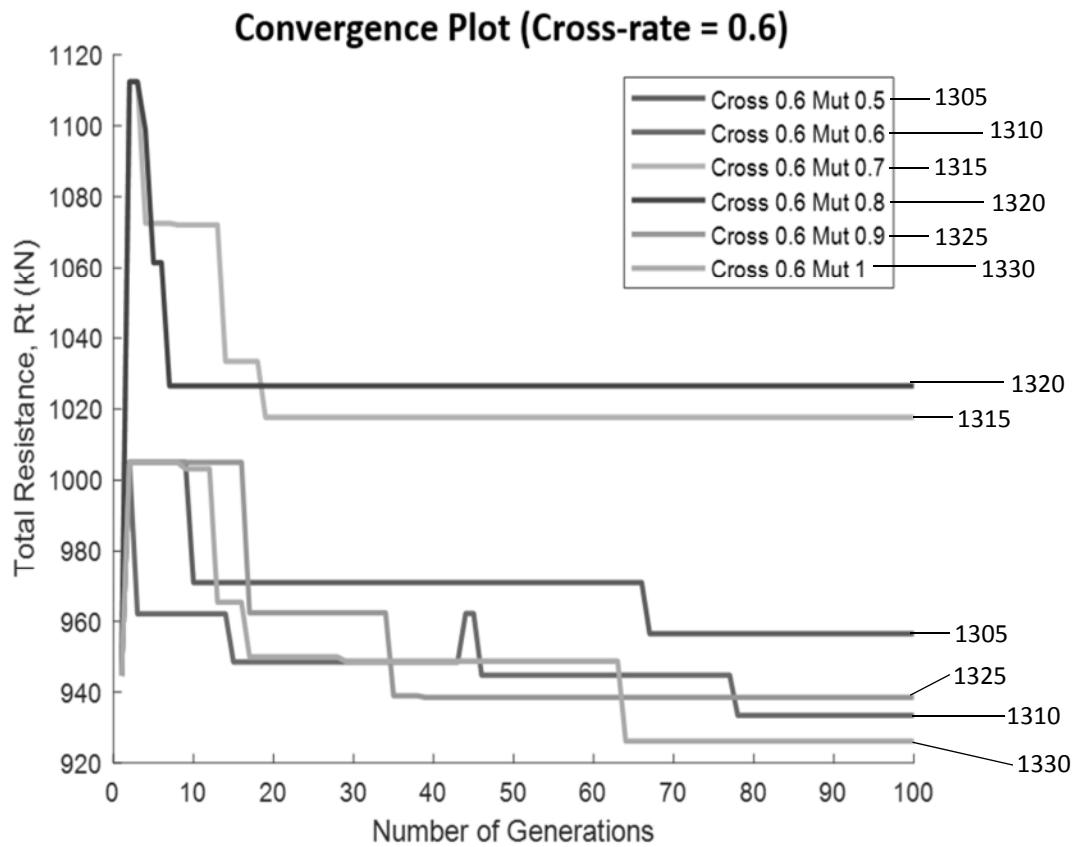


Figure 43(b)

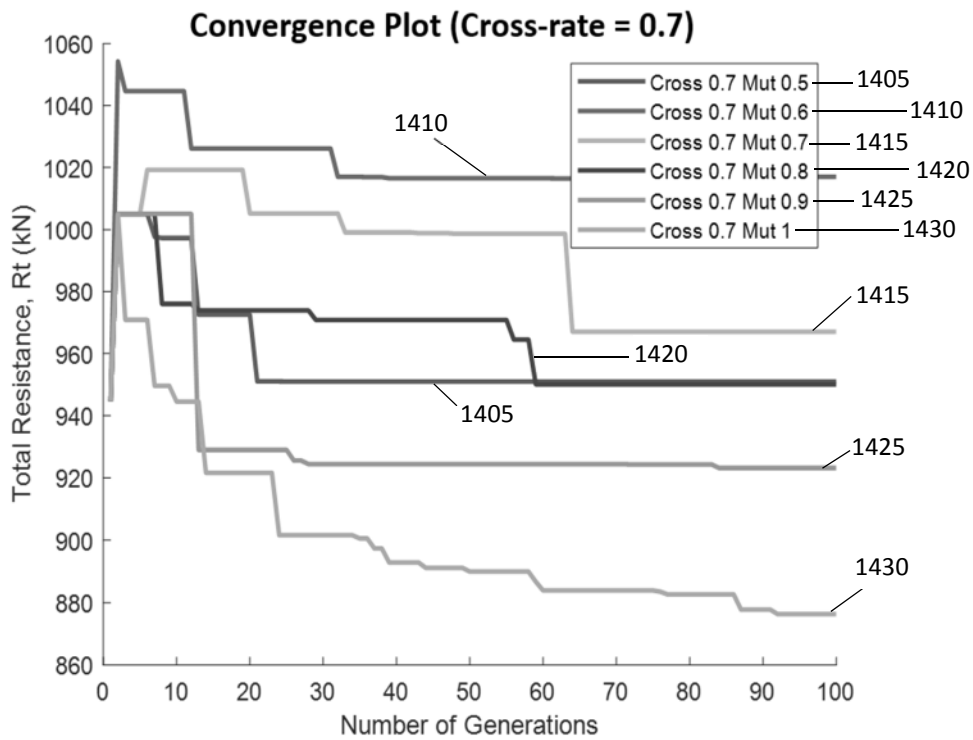


Figure 43(c)

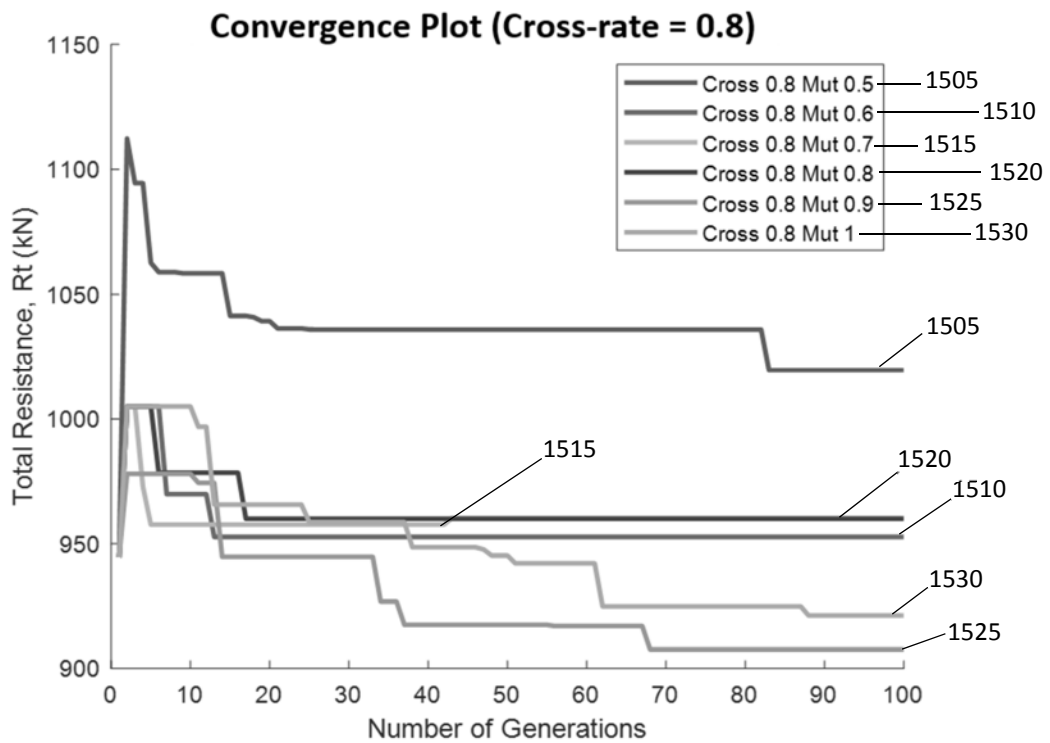


Figure 43(d)

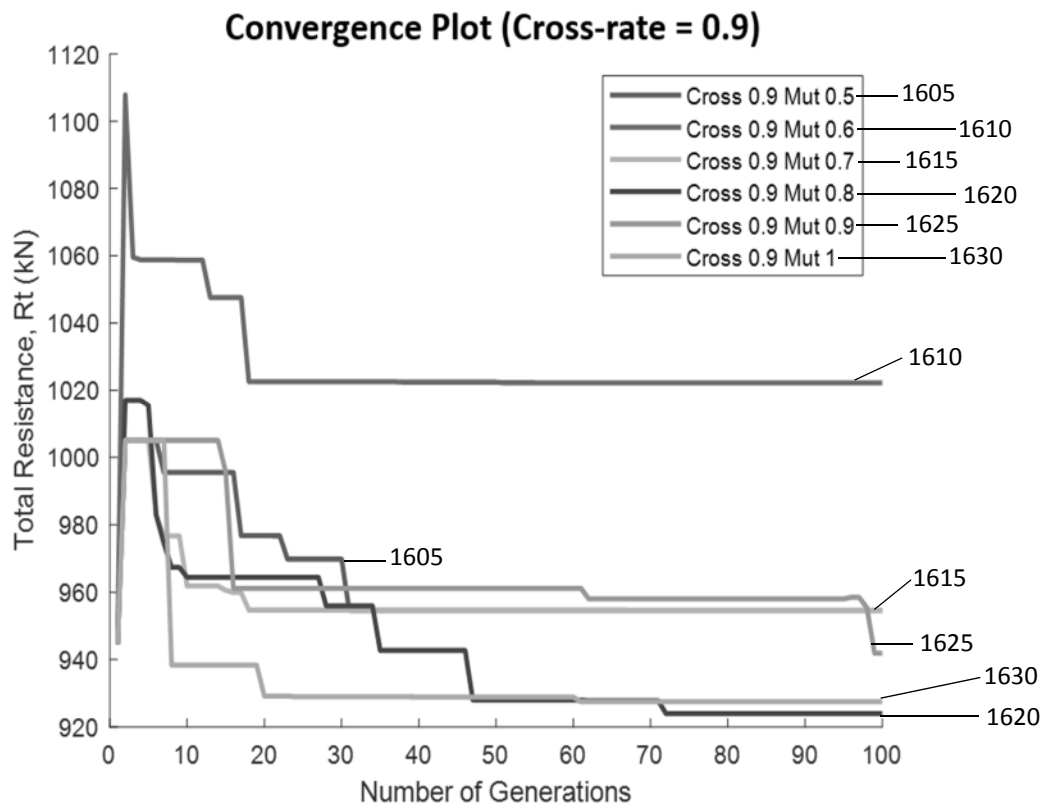


Figure 43(e)

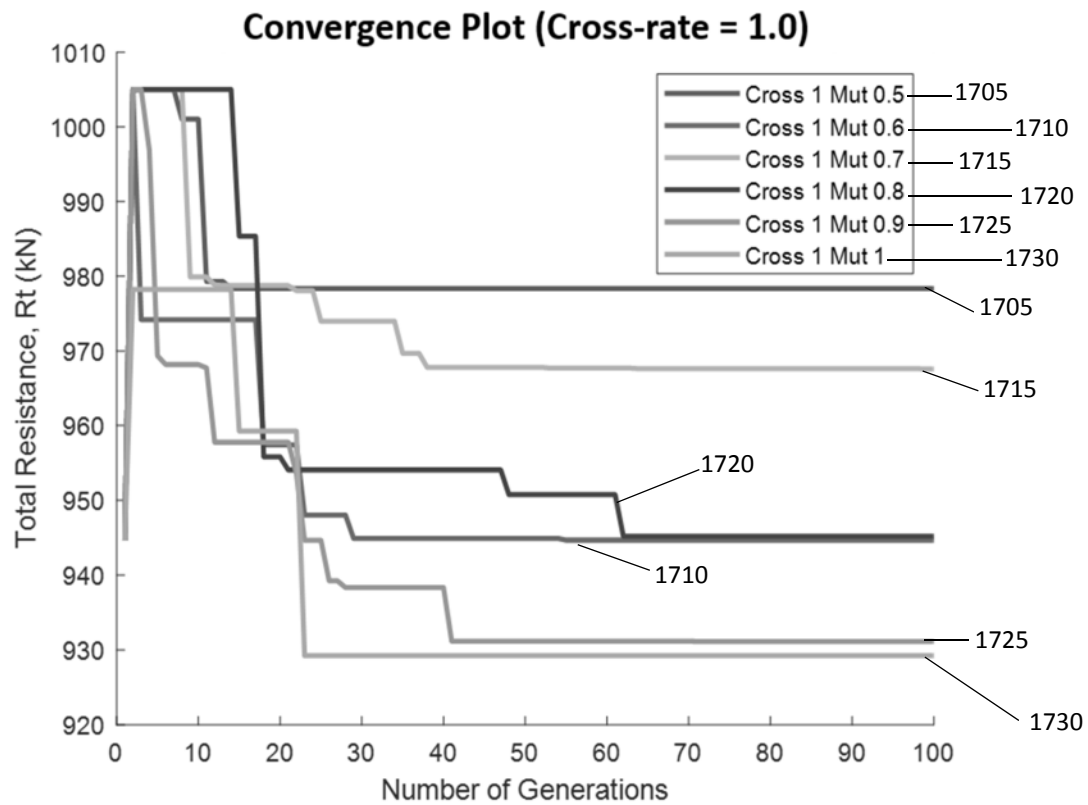


Figure 43(f)

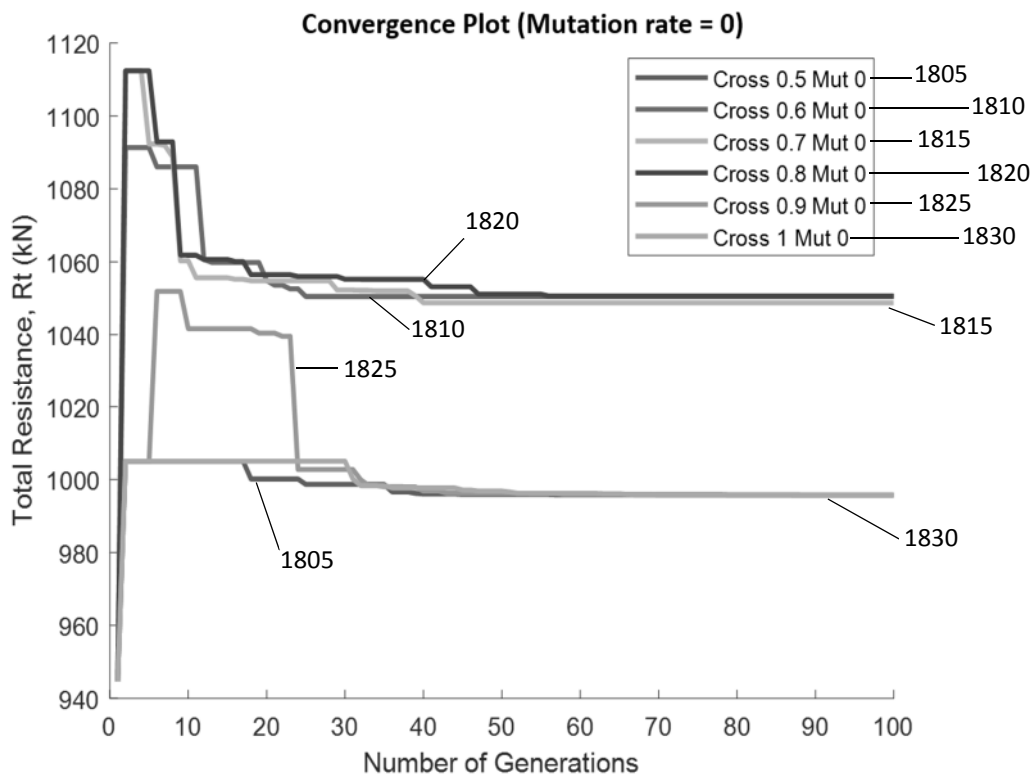


Figure 44

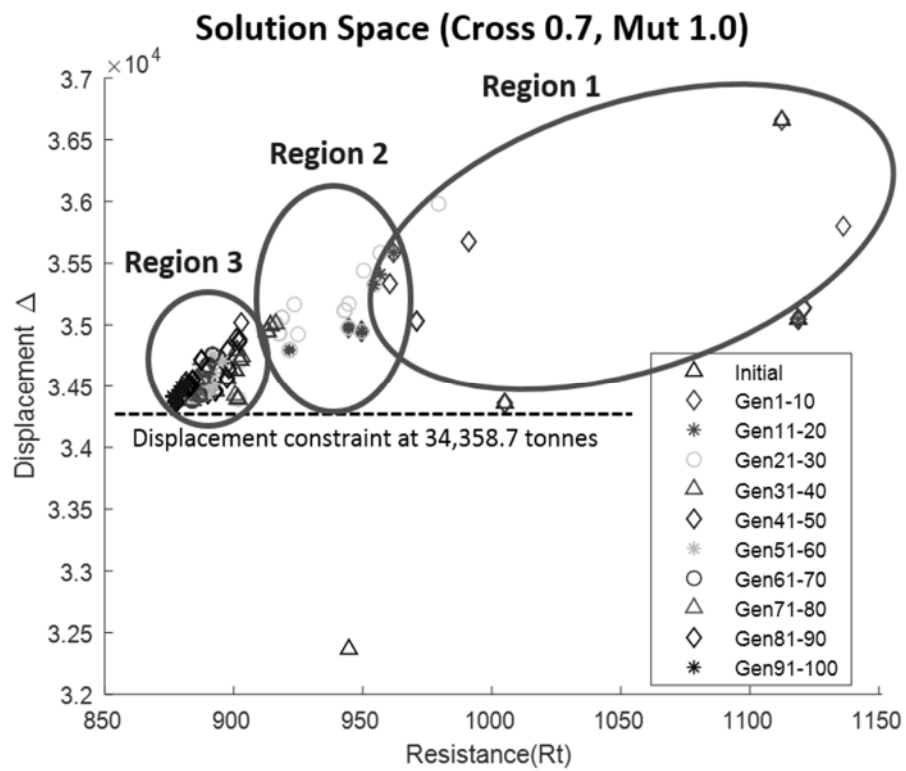


Figure 45

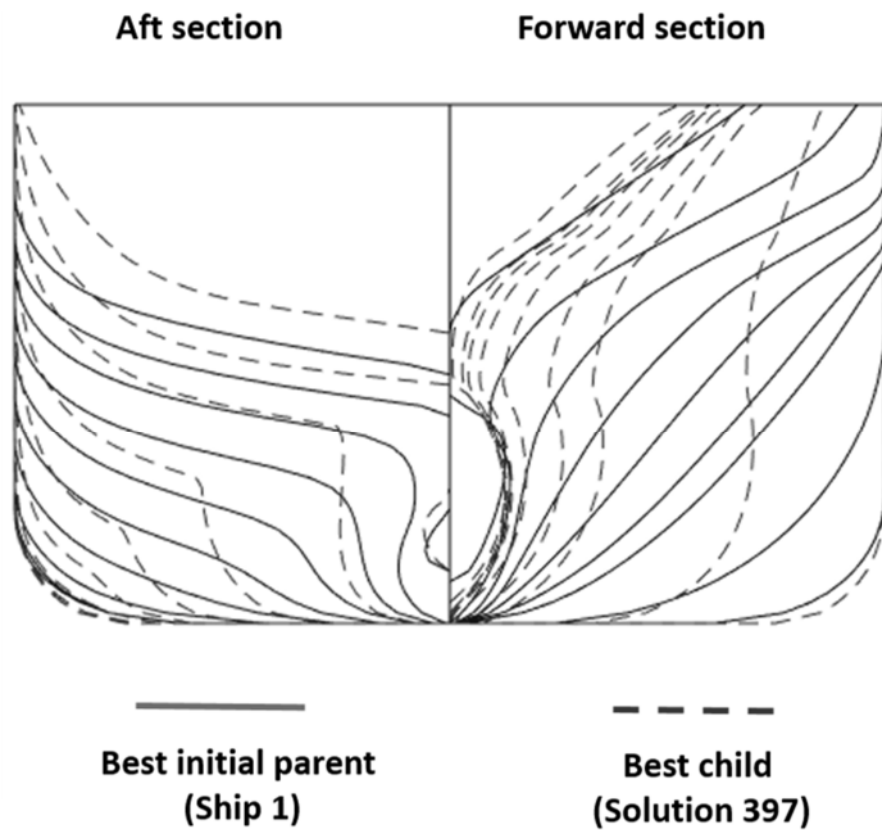
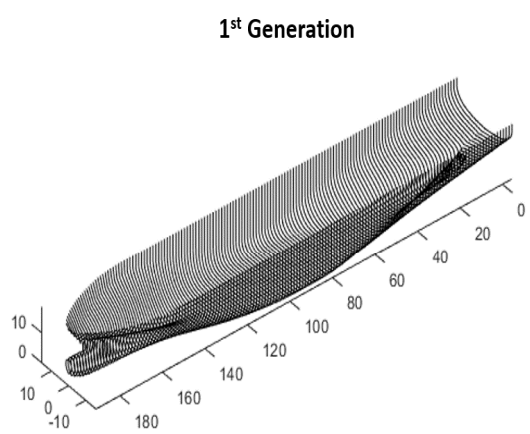
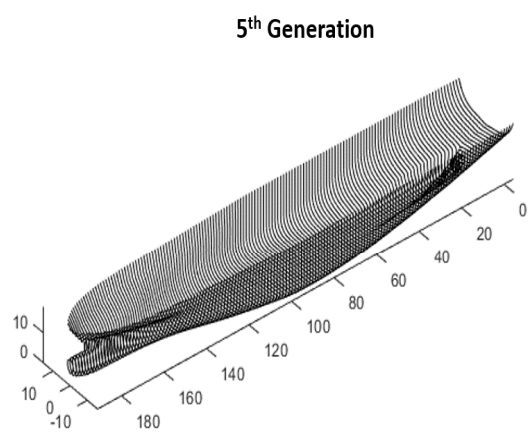


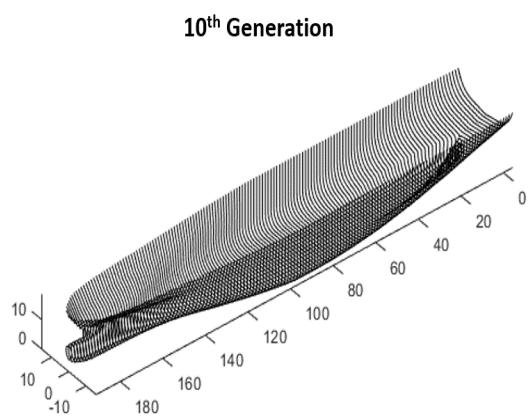
Figure 46



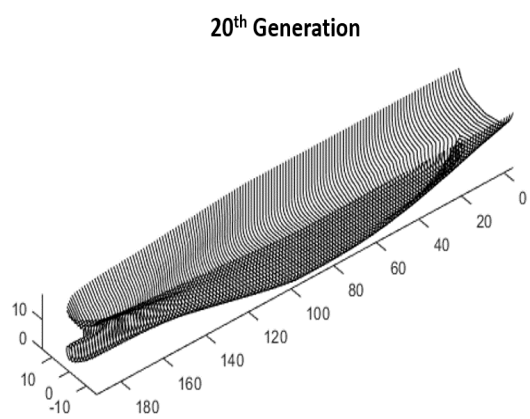
(a)



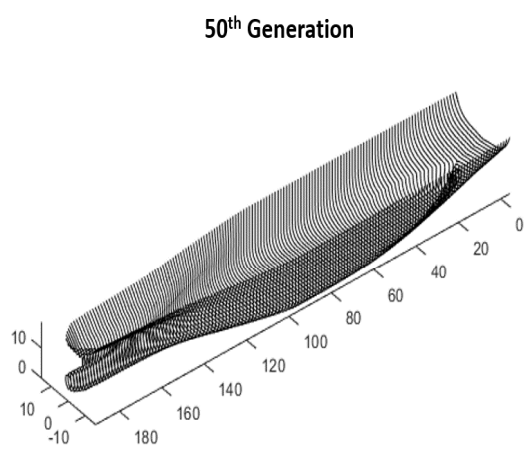
(b)



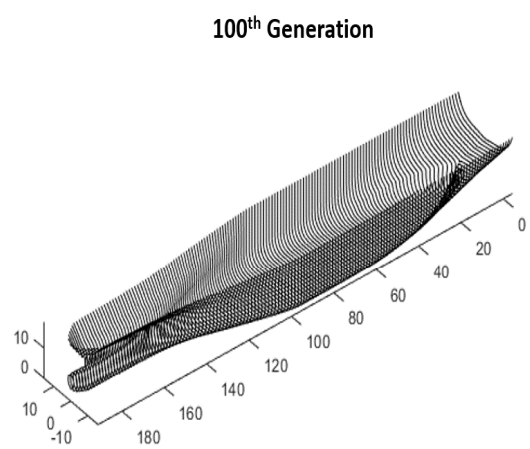
(c)



(d)



(e)



(f)

Figure 47
41 / 82

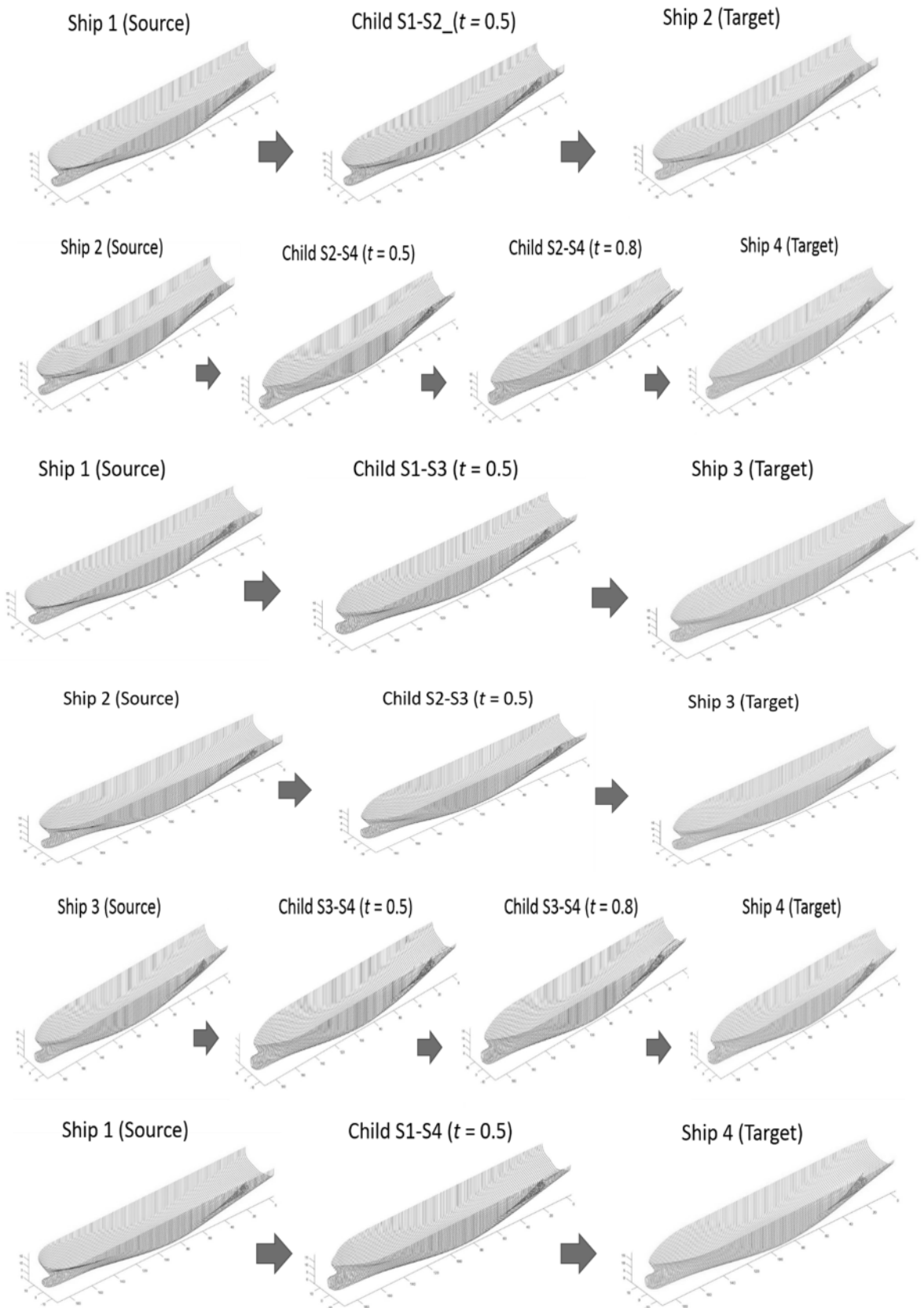


Figure 48

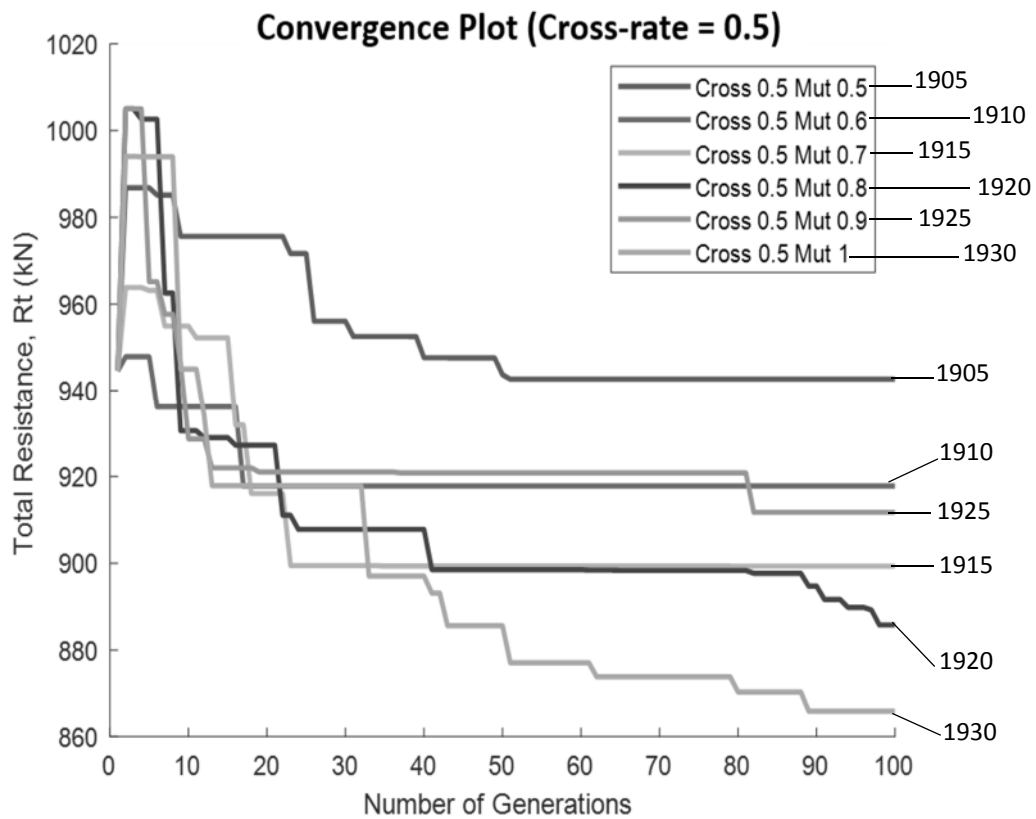


Figure 49(a)

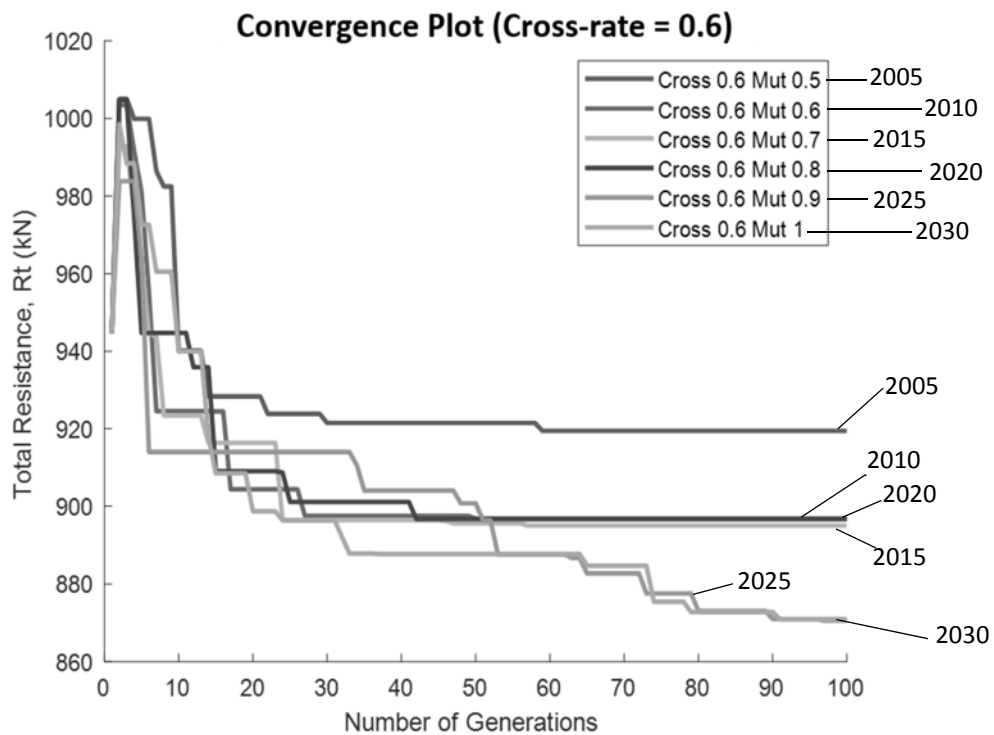


Figure 49(b)

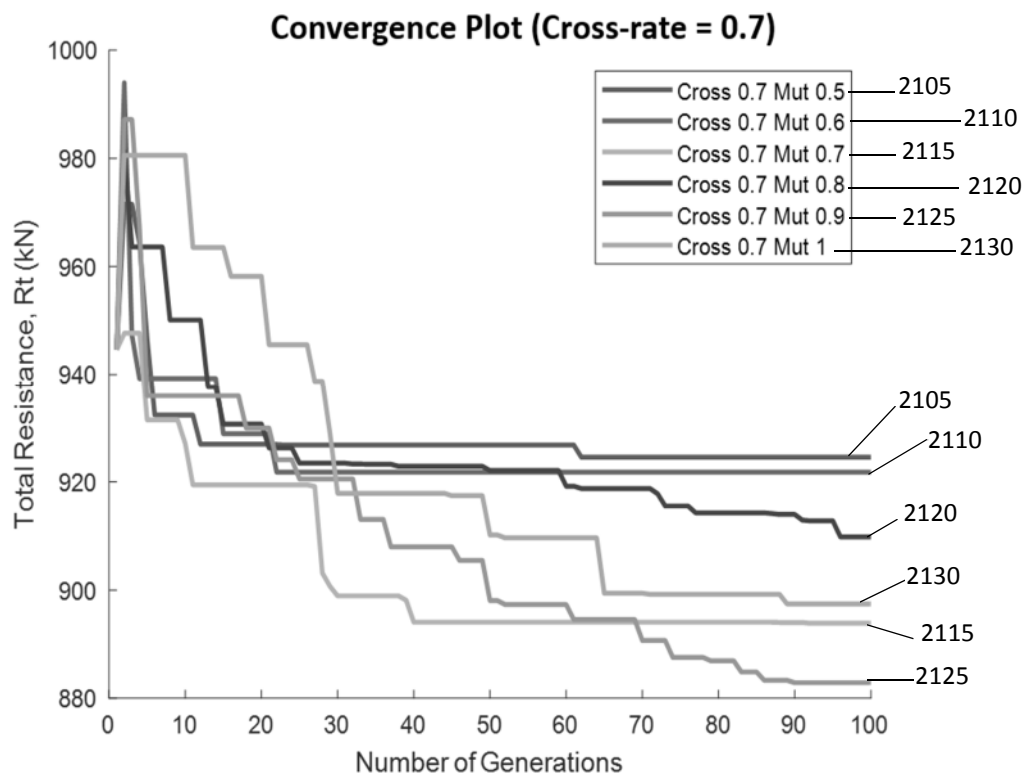


Figure 49(c)

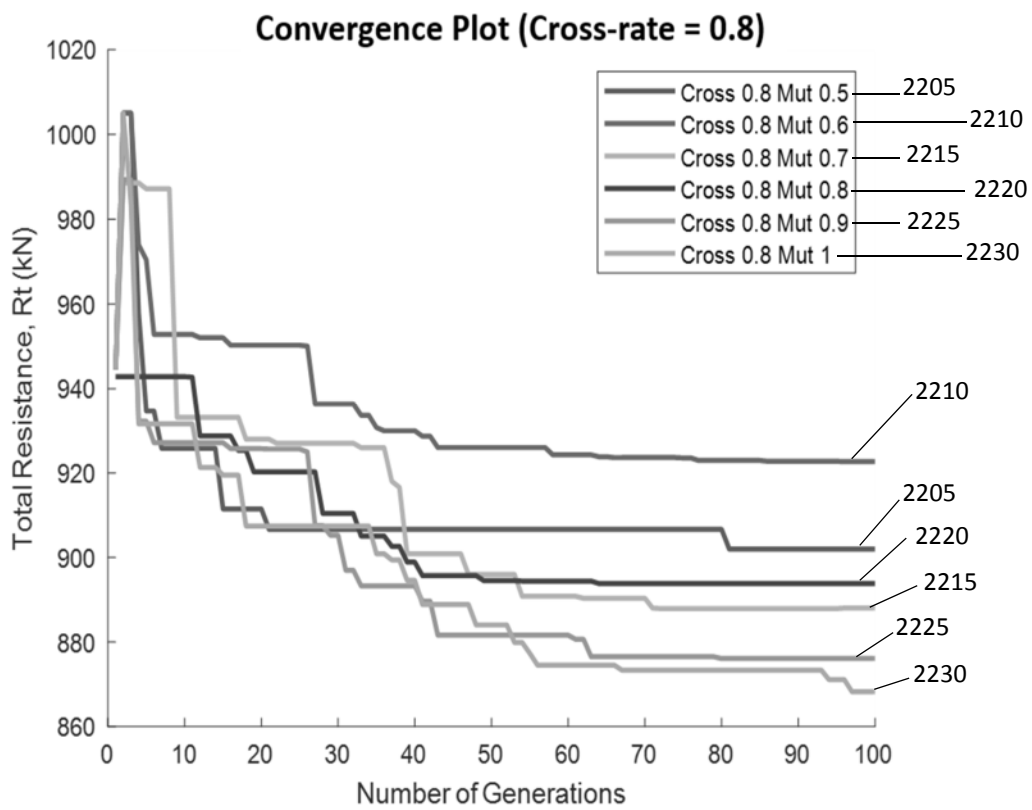


Figure 49(d)

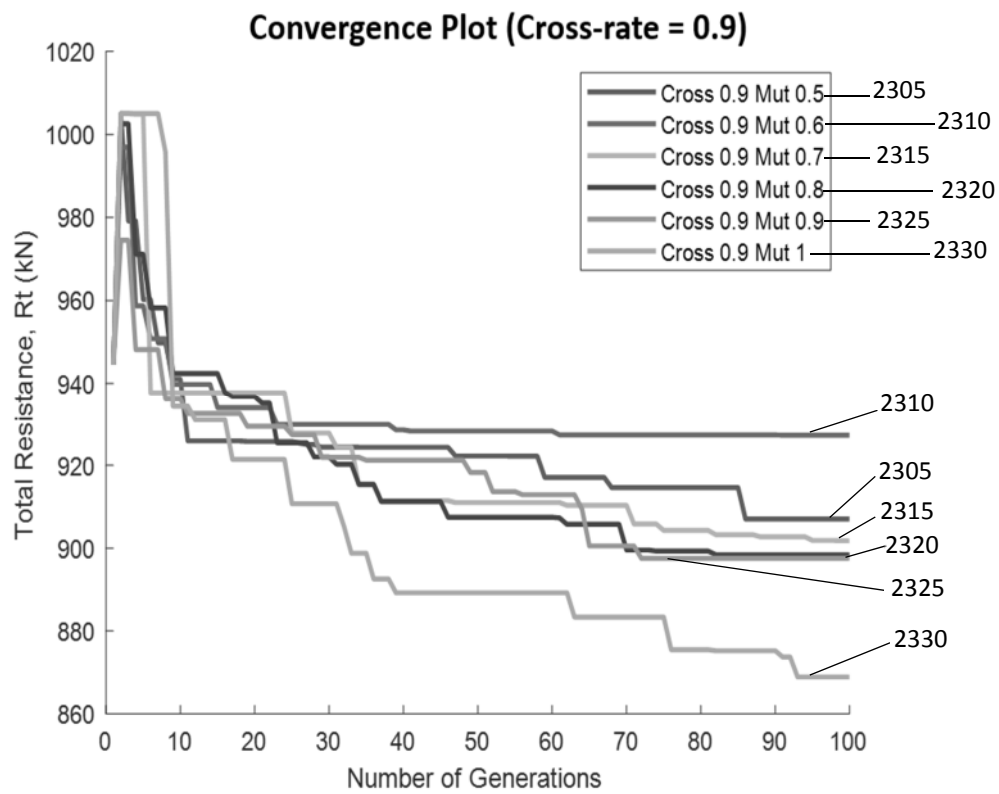


Figure 49(e)

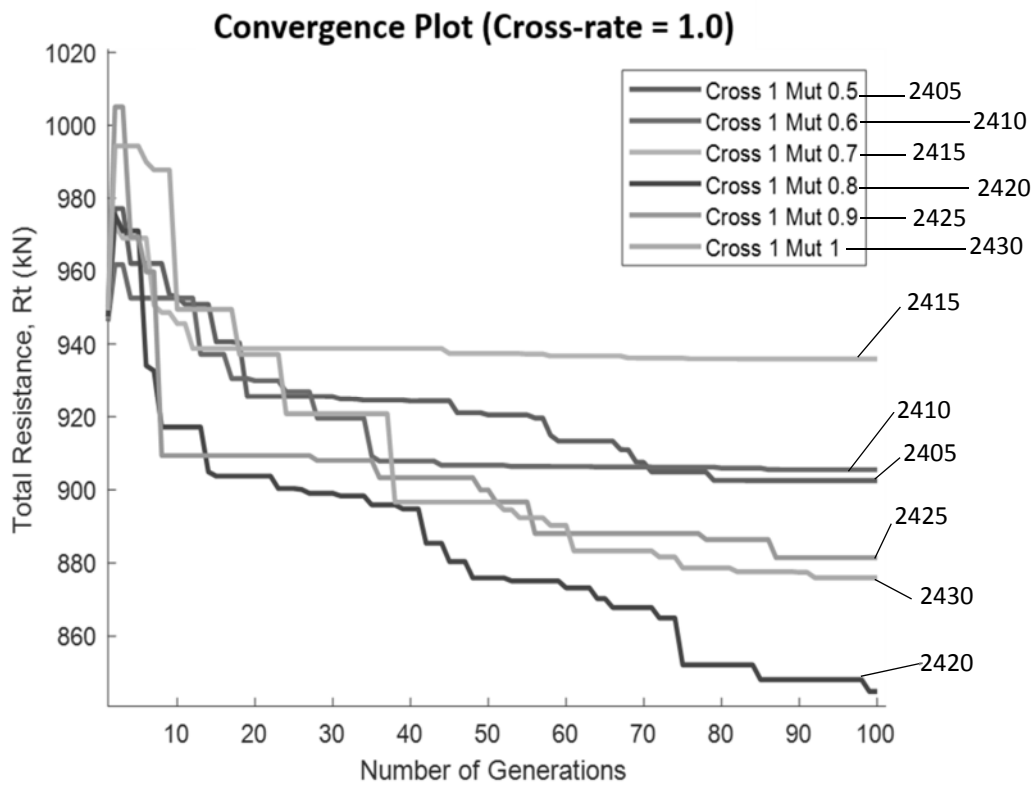


Figure 49(f)

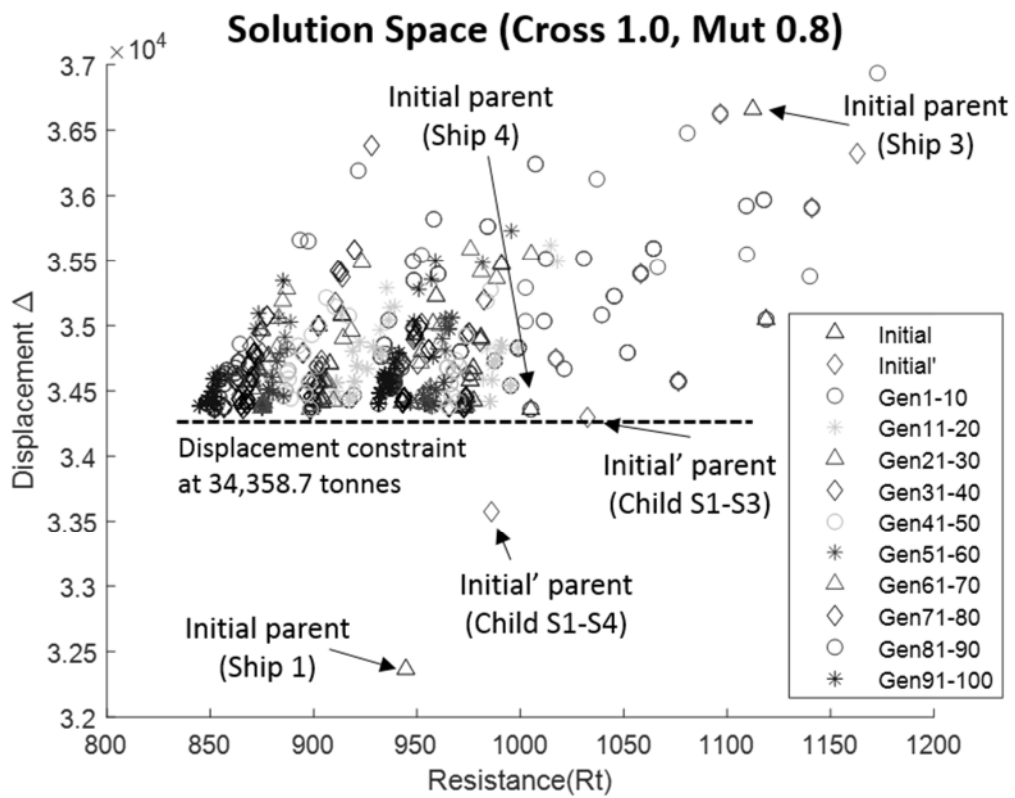


Figure 50

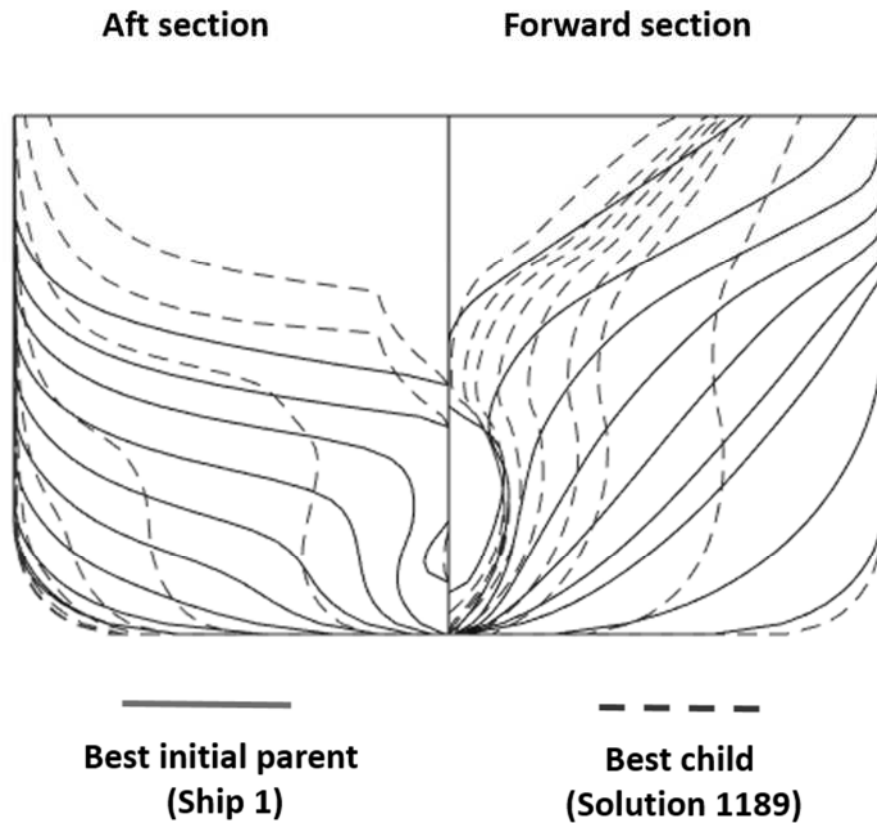
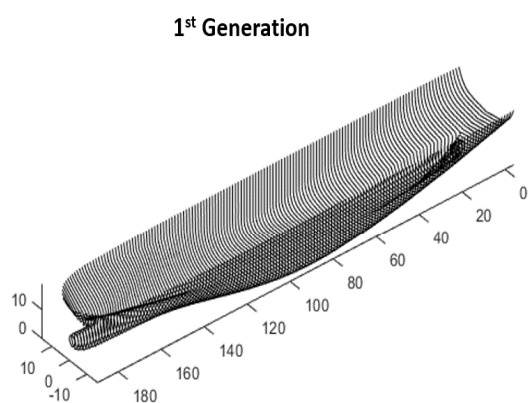
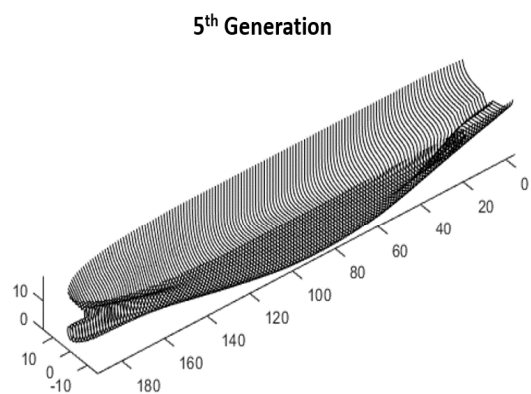


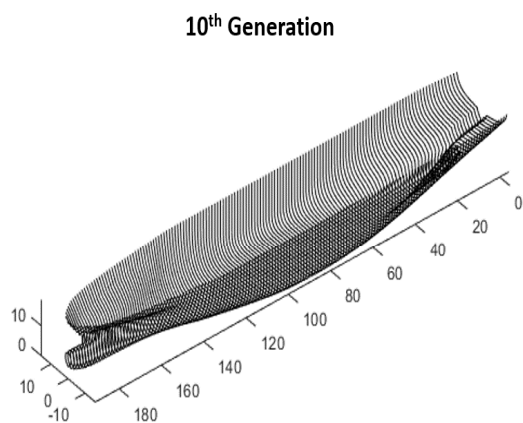
Figure 51



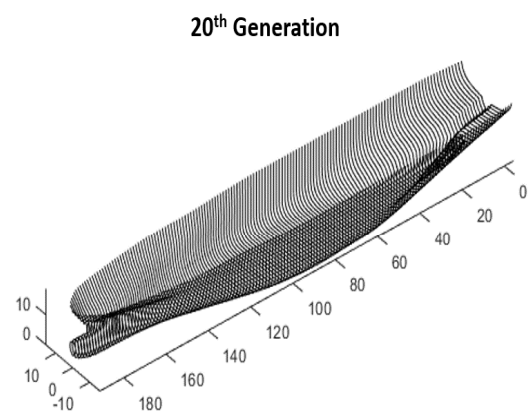
(a)



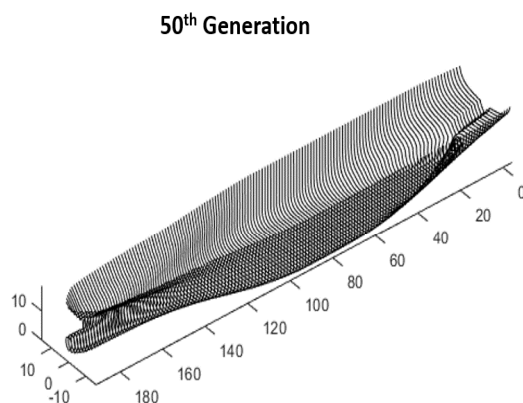
(b)



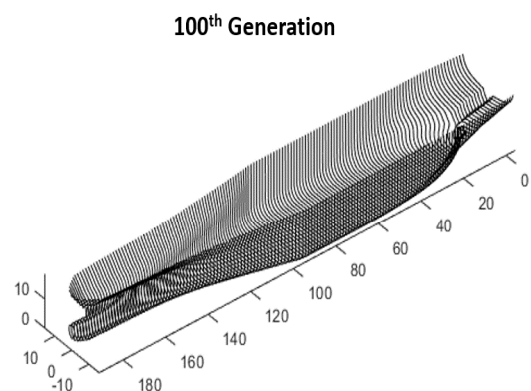
(c)



(d)



(e)



(f)

Figure 52

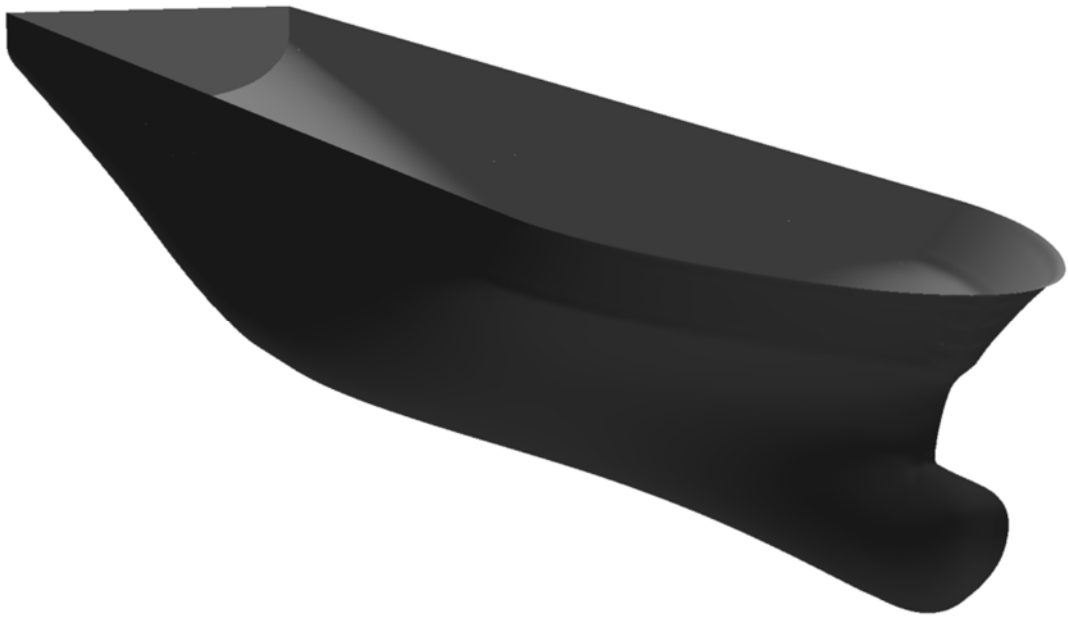


Figure 53

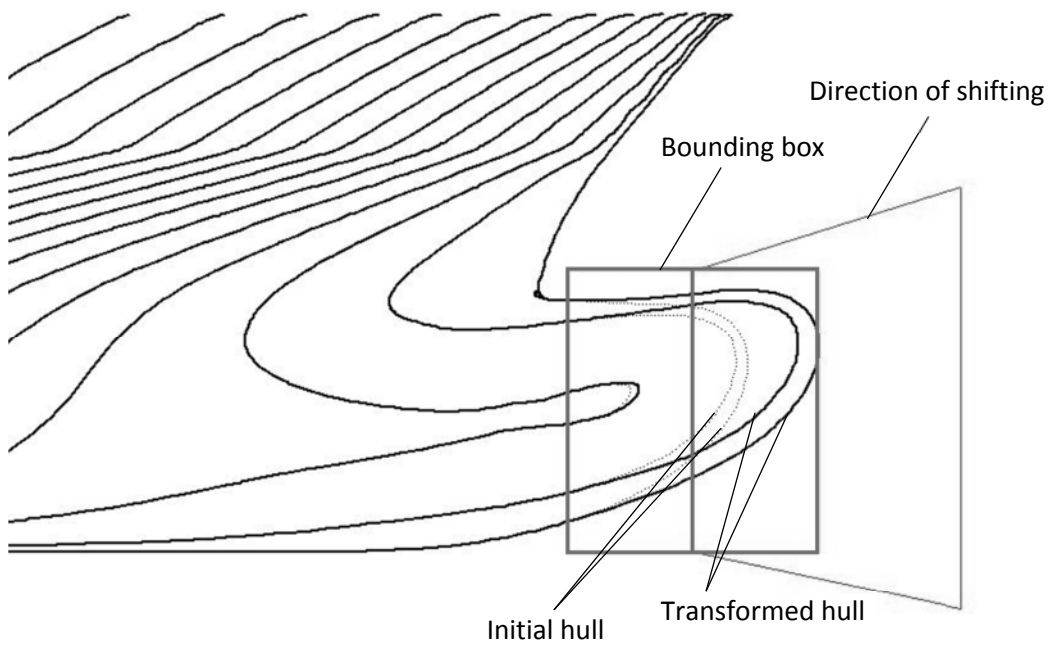


Figure 54

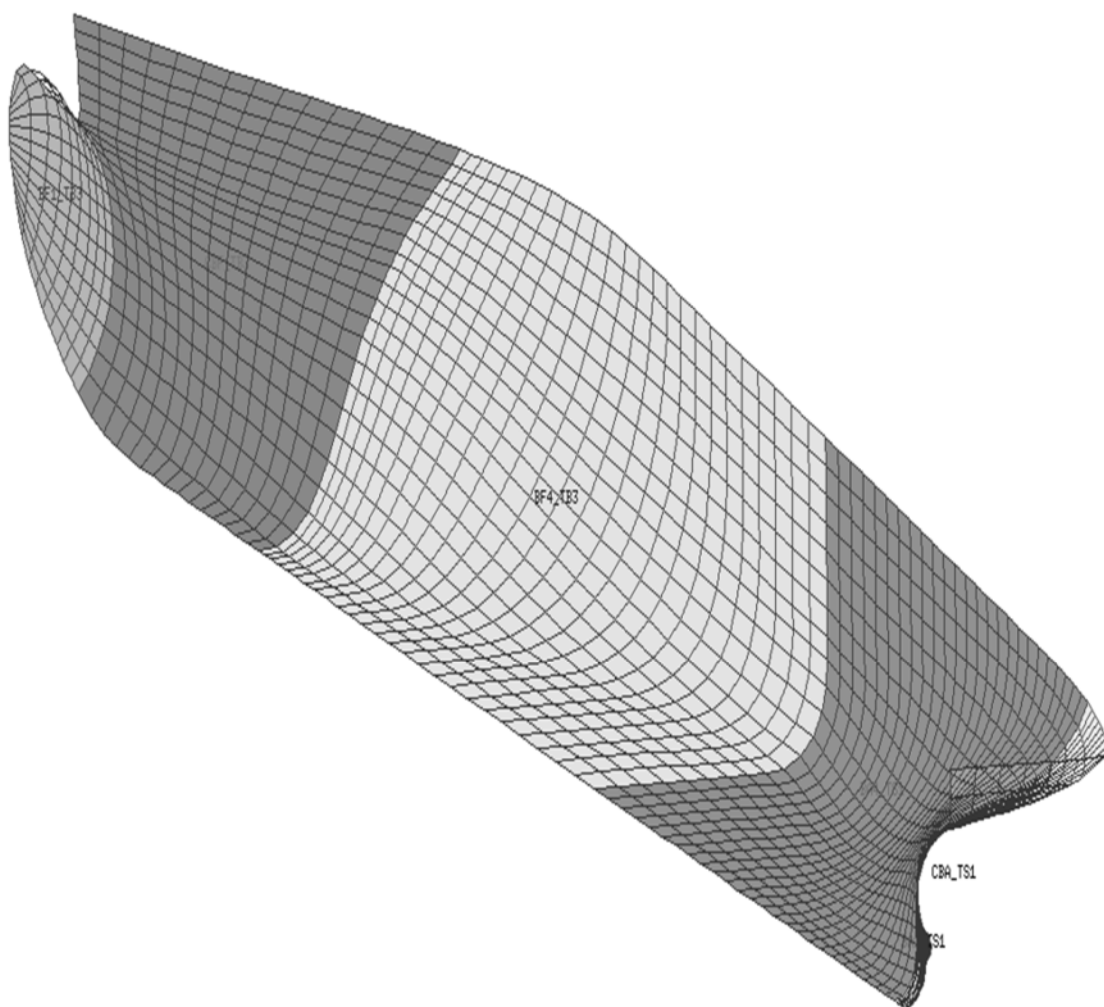


Figure 55

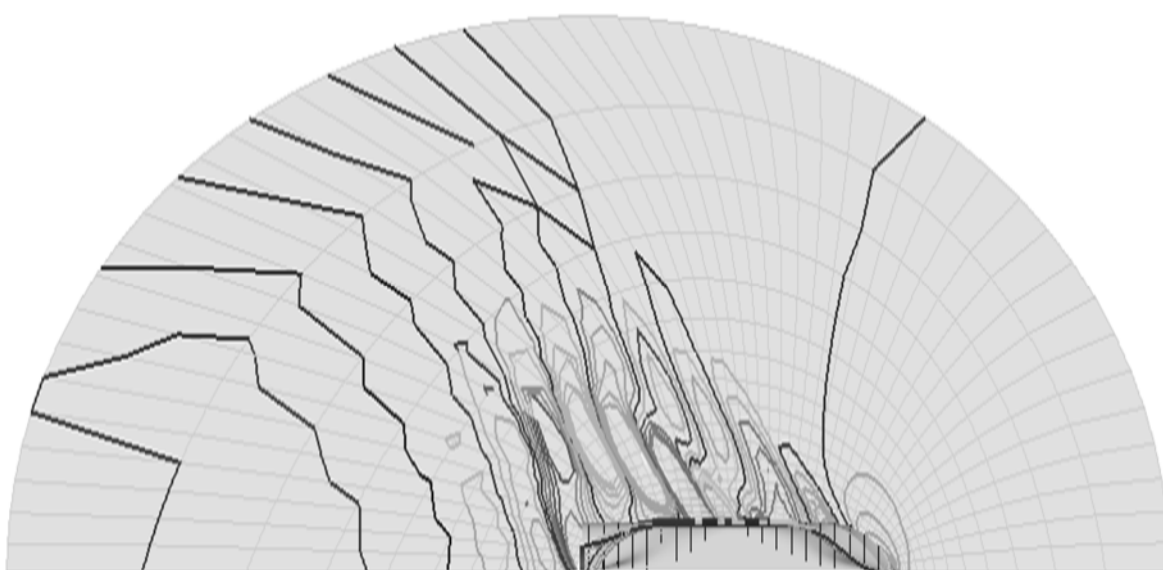


Figure 56

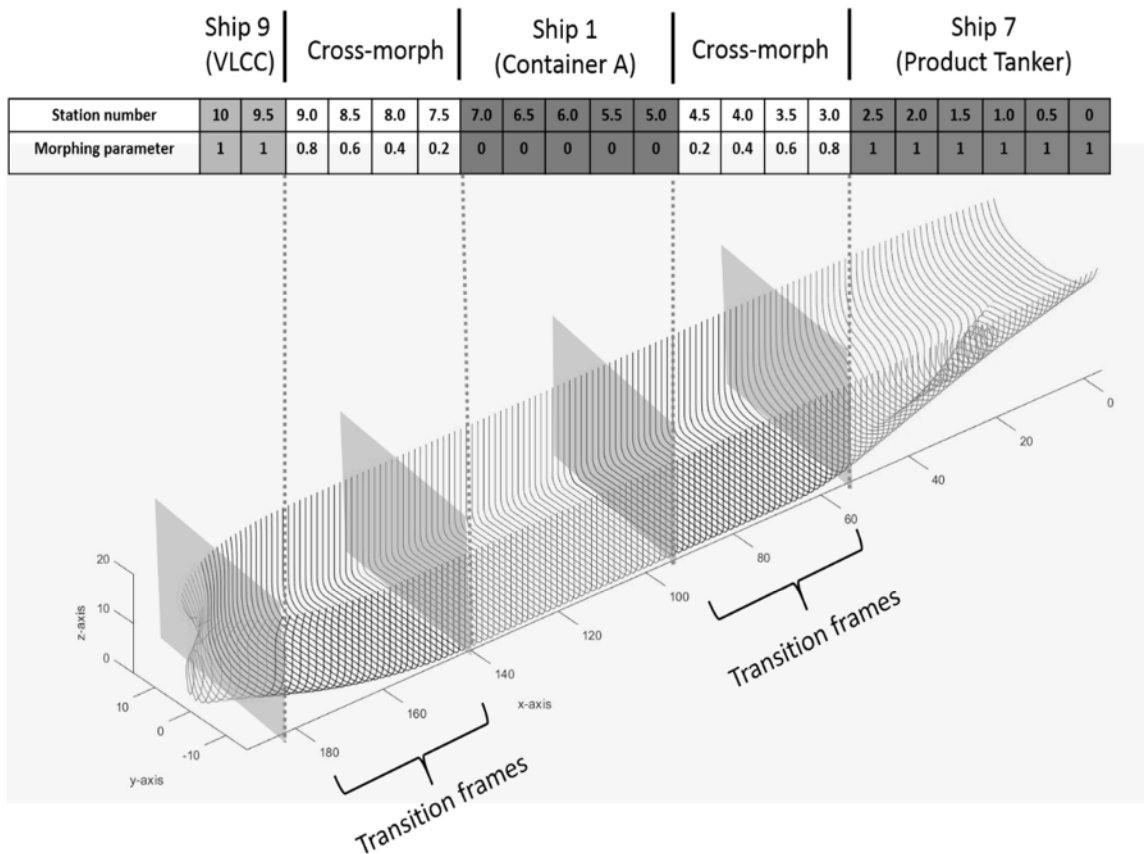


Figure 57

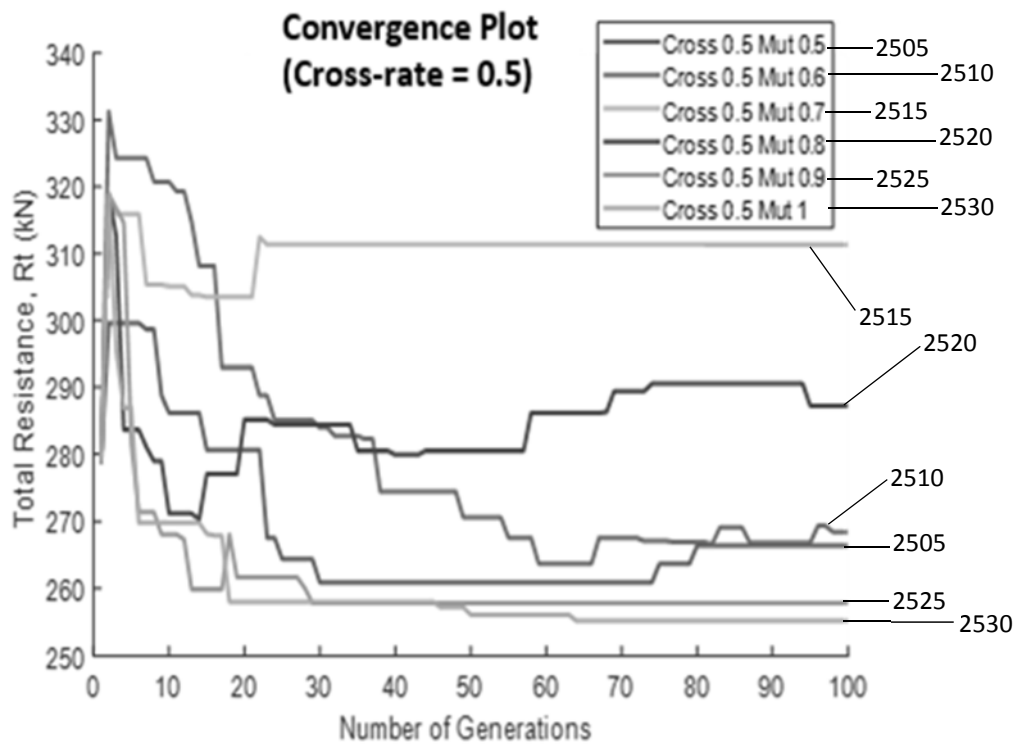


Figure 58(a)

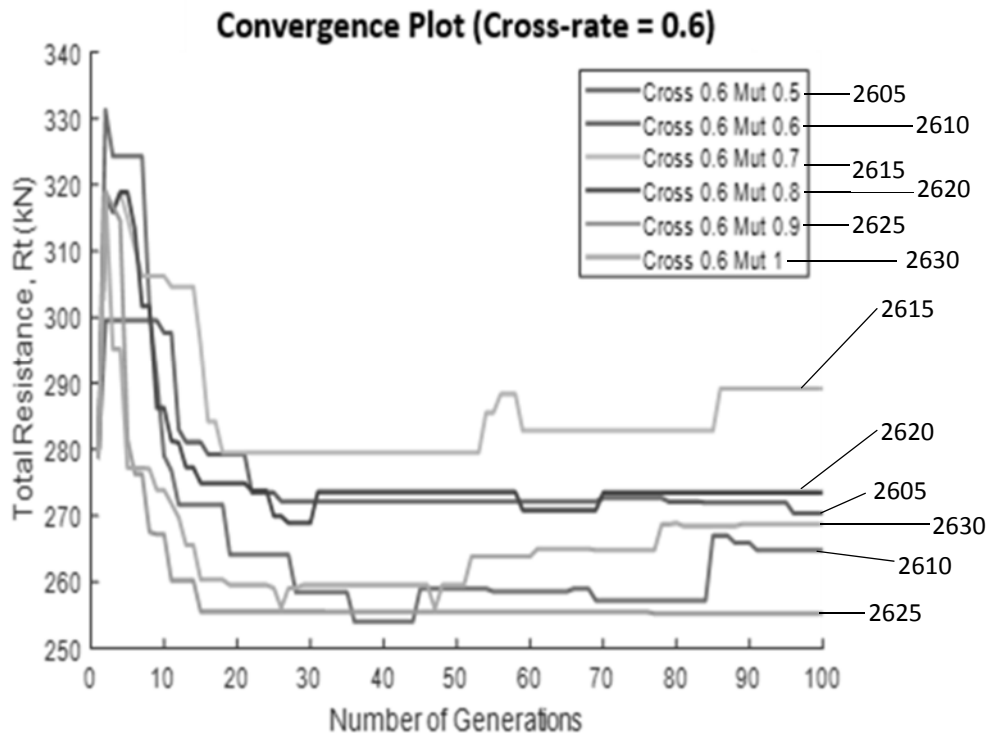


Figure 58(b)

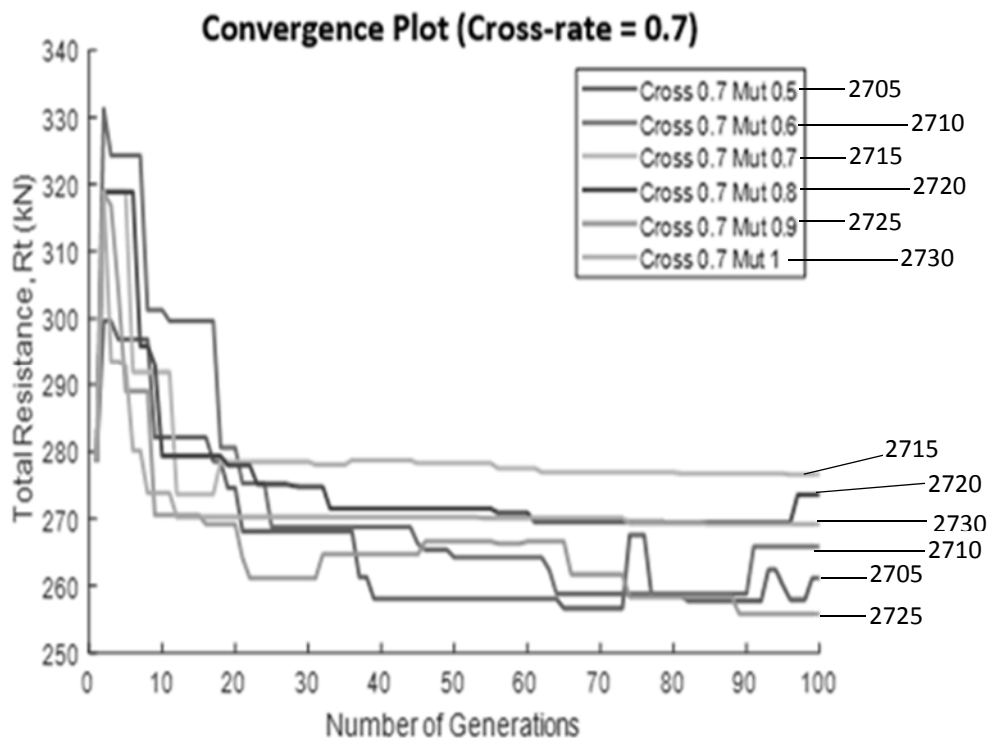


Figure 58(c)

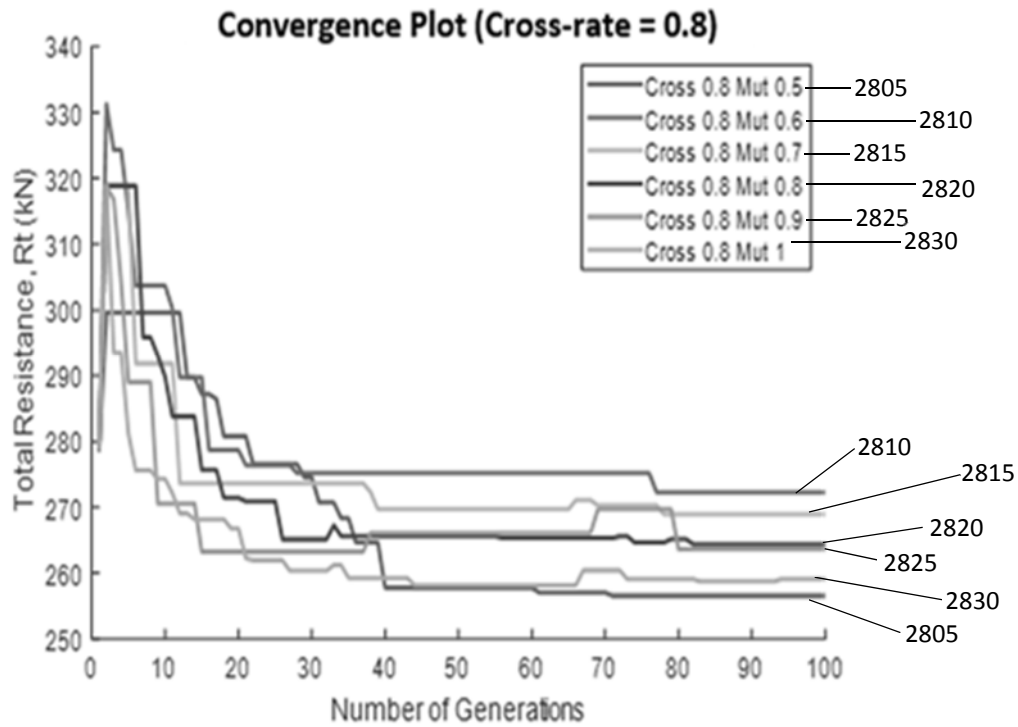


Figure 58(d)

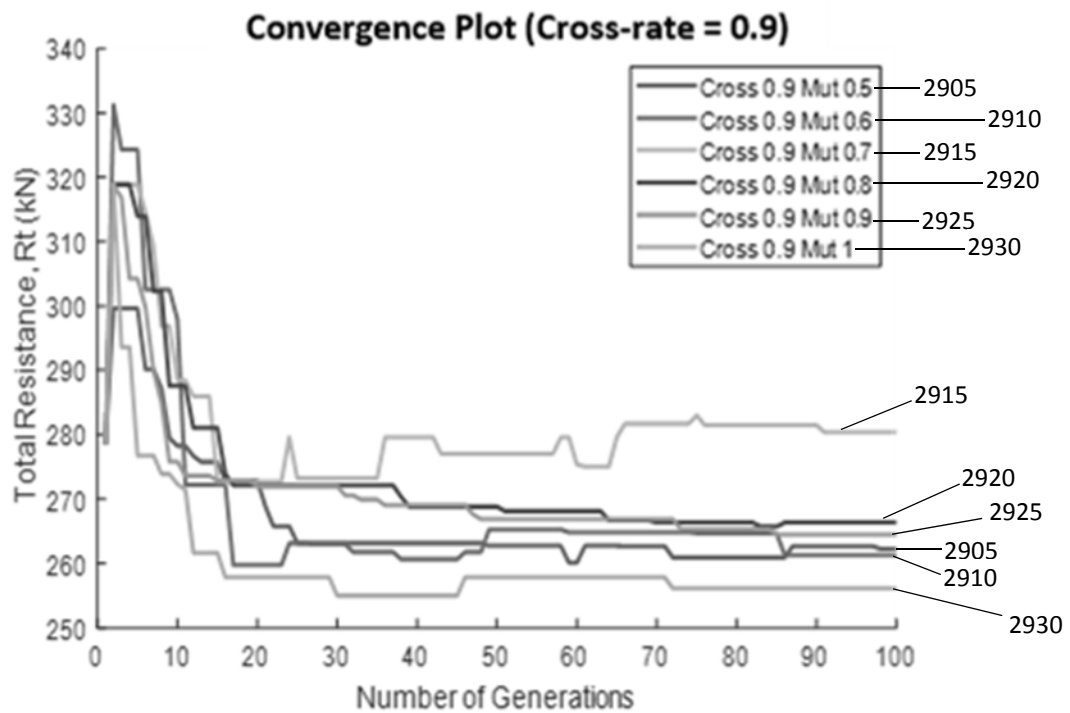


Figure 58(e)

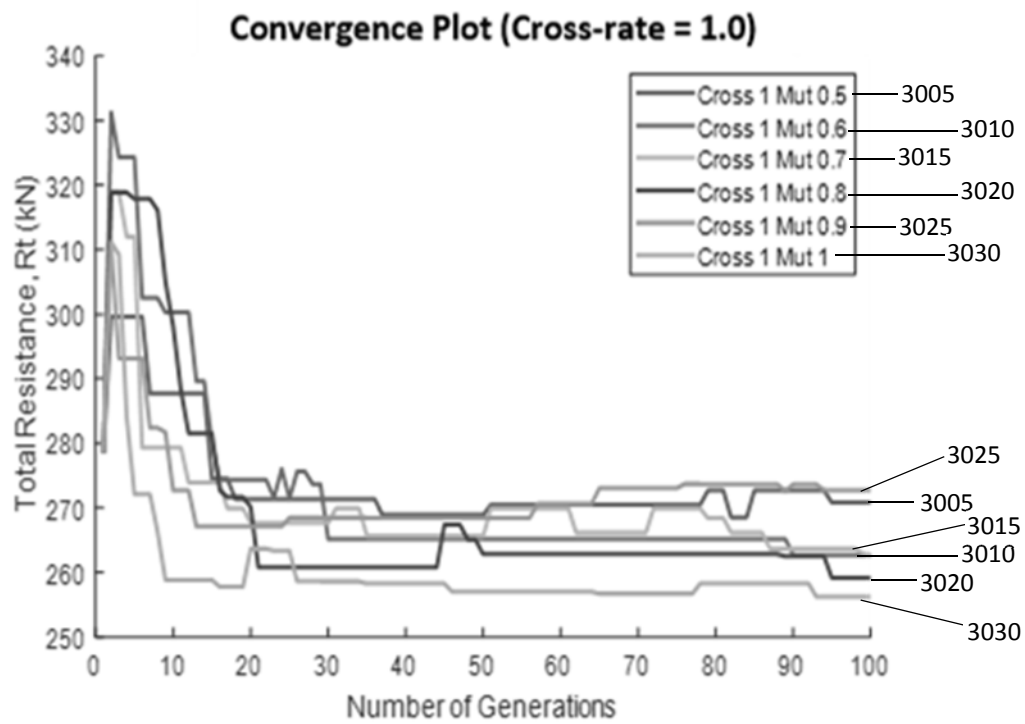


Figure 58(f)

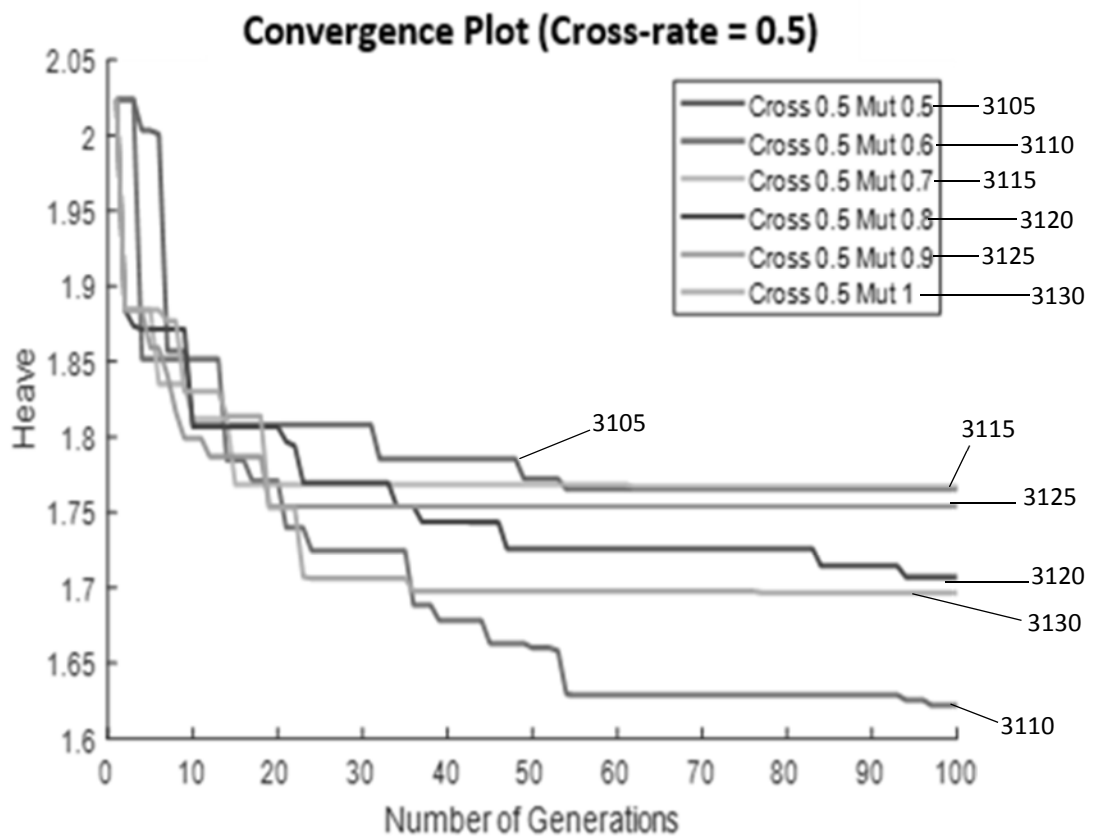


Figure 59(a)

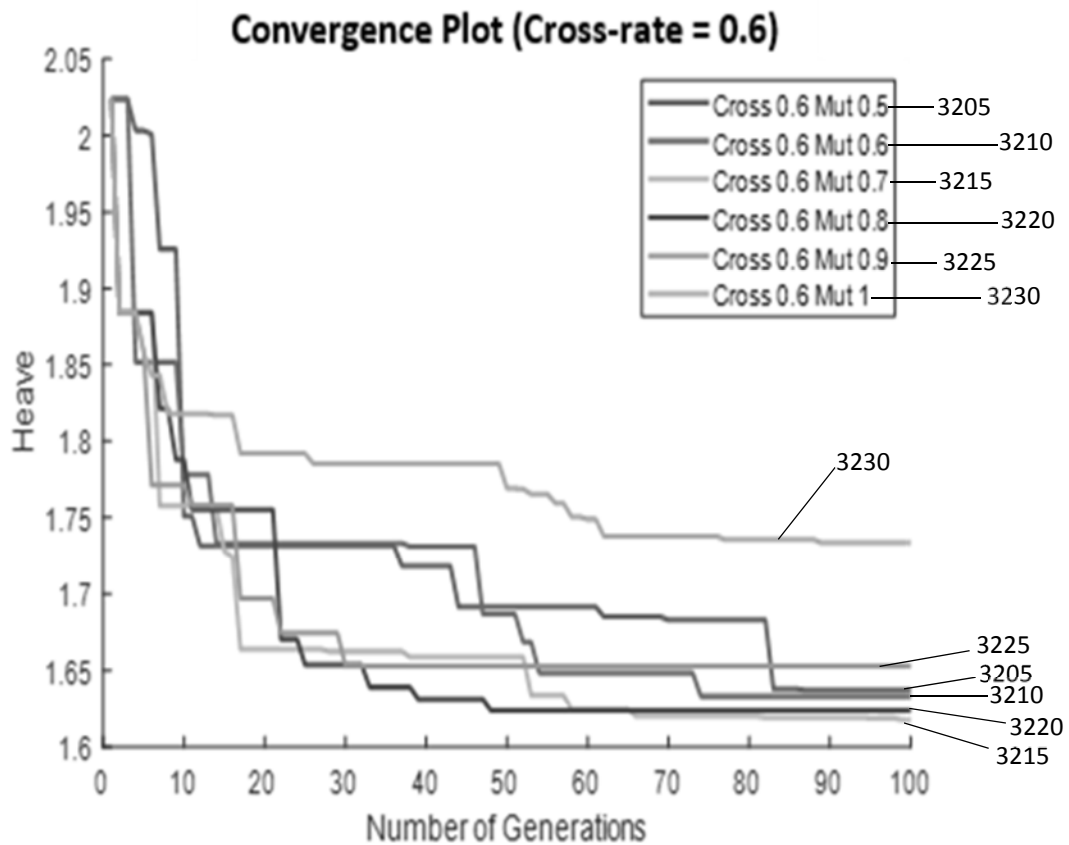


Figure 59(b)

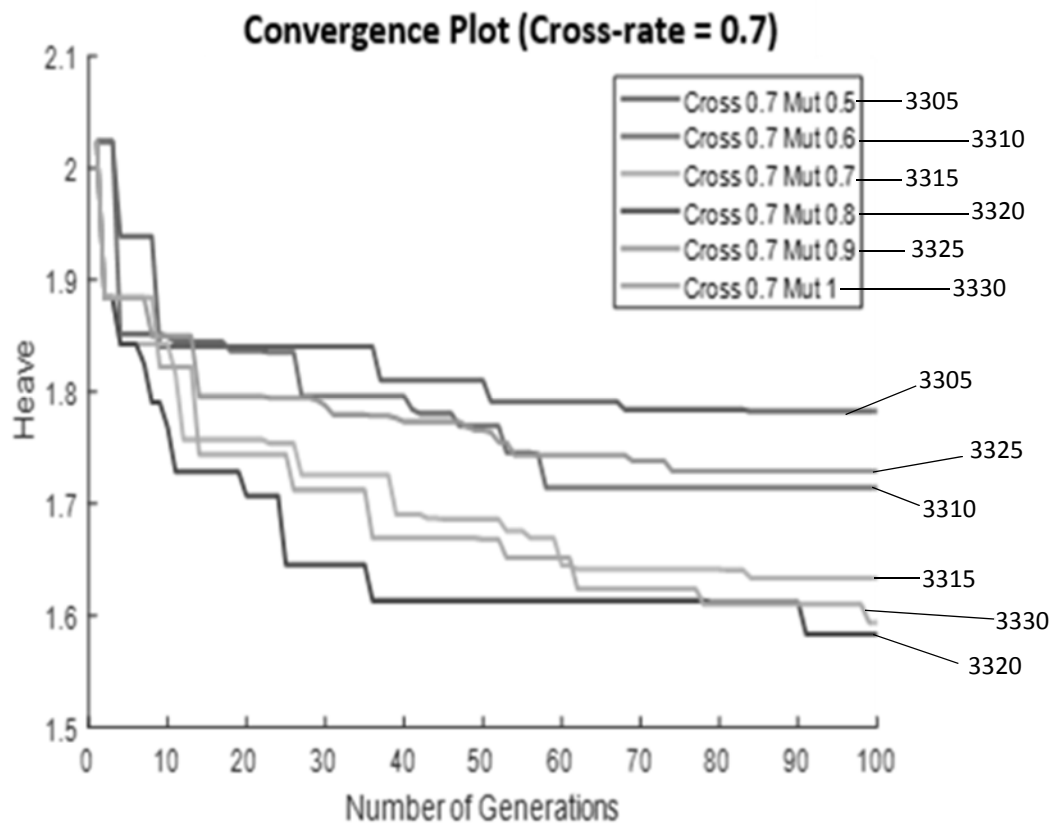


Figure 59(c)

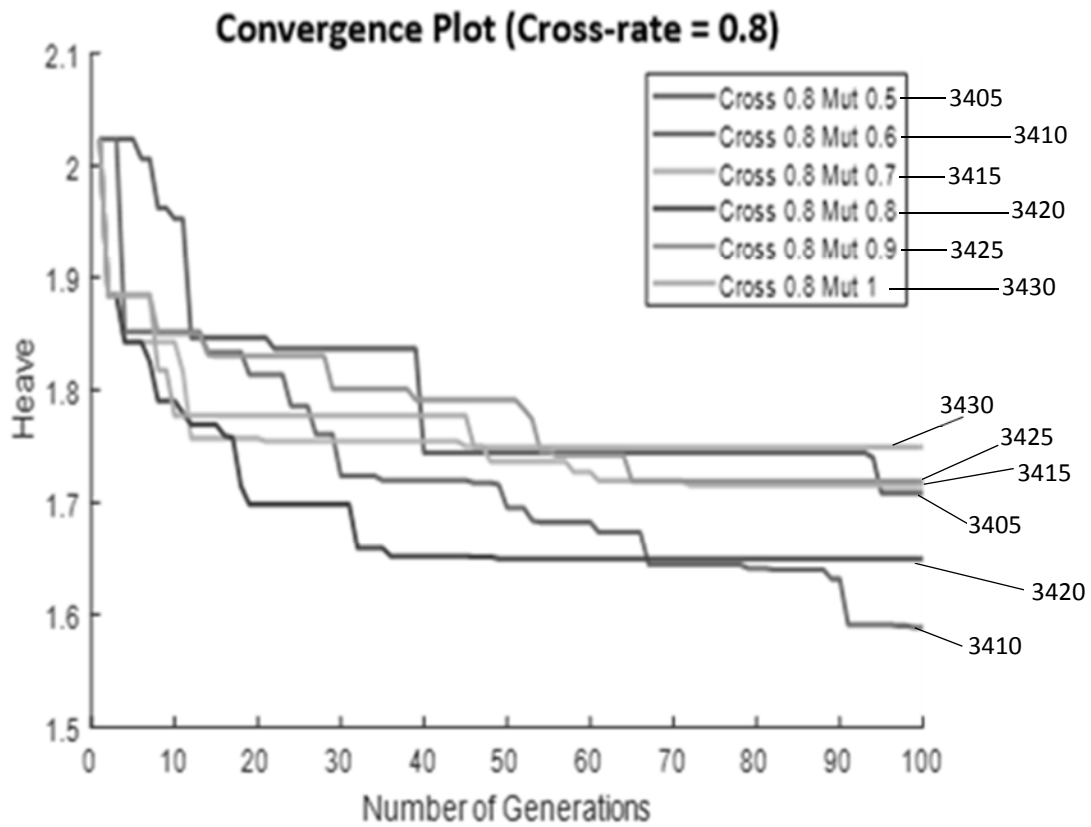


Figure 59(d)

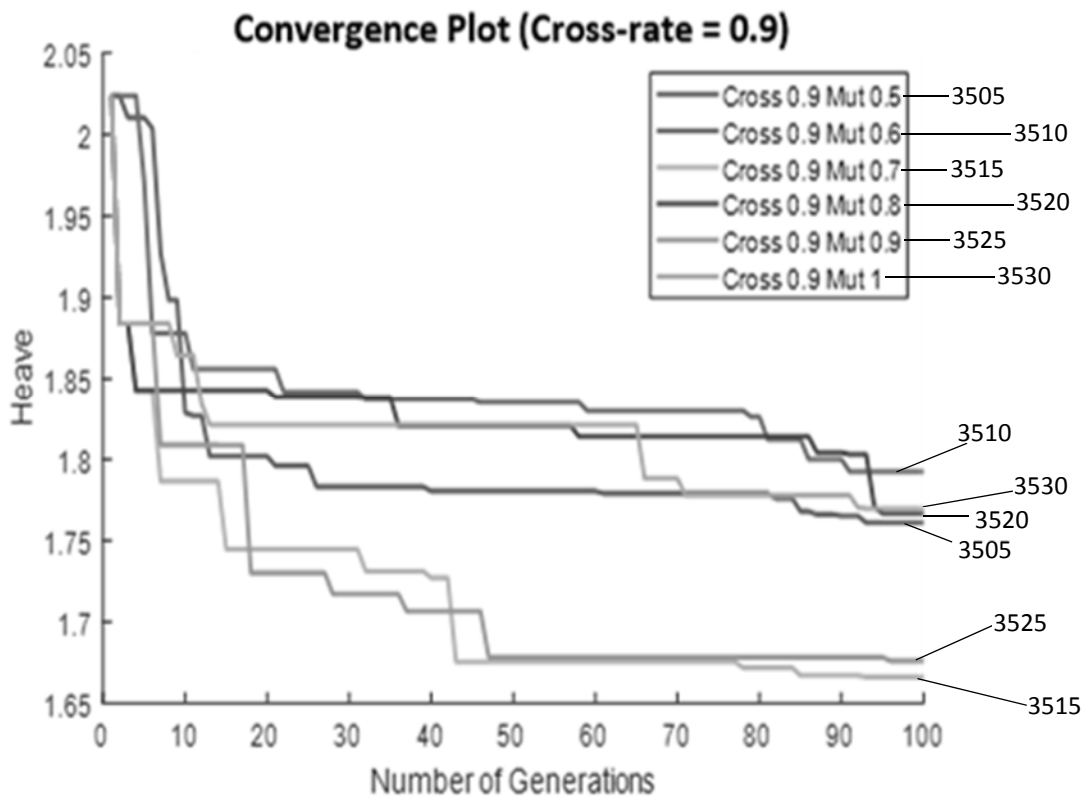


Figure 59(e)

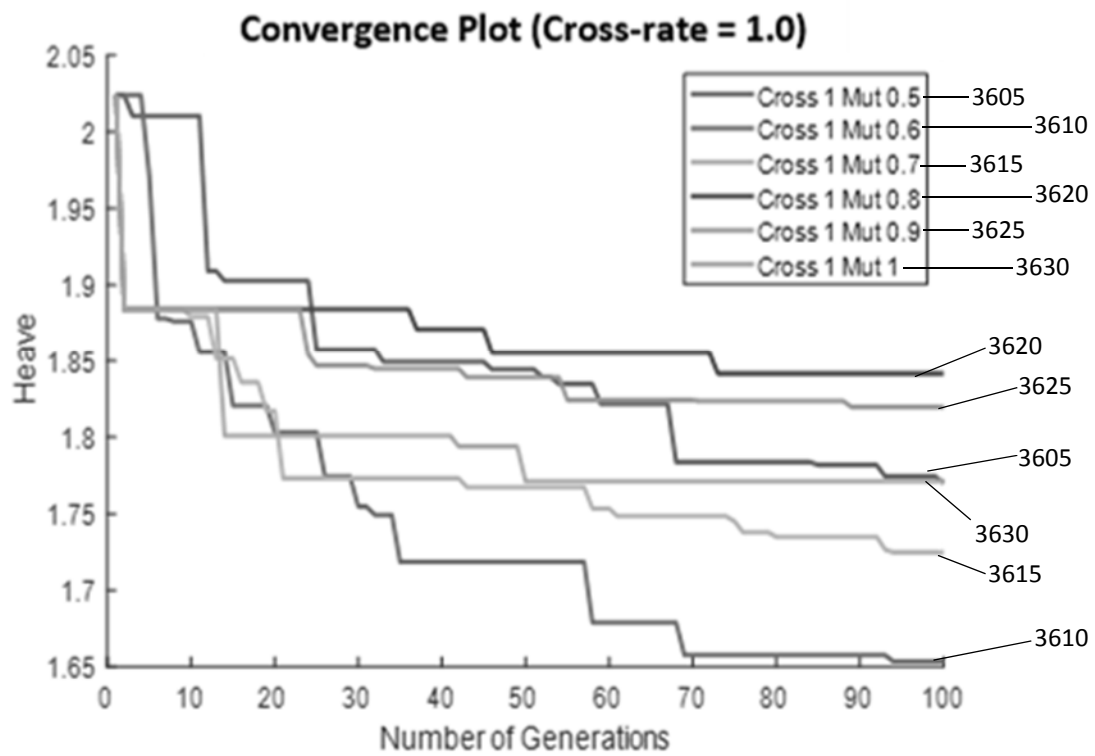


Figure 59(f)

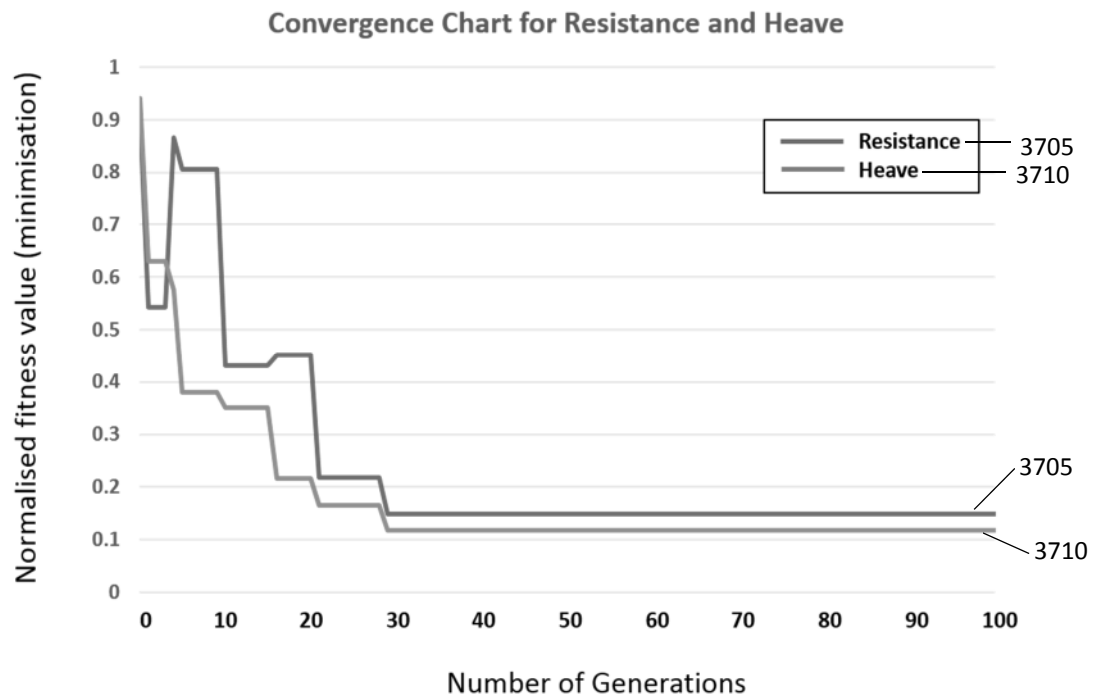


Figure 60

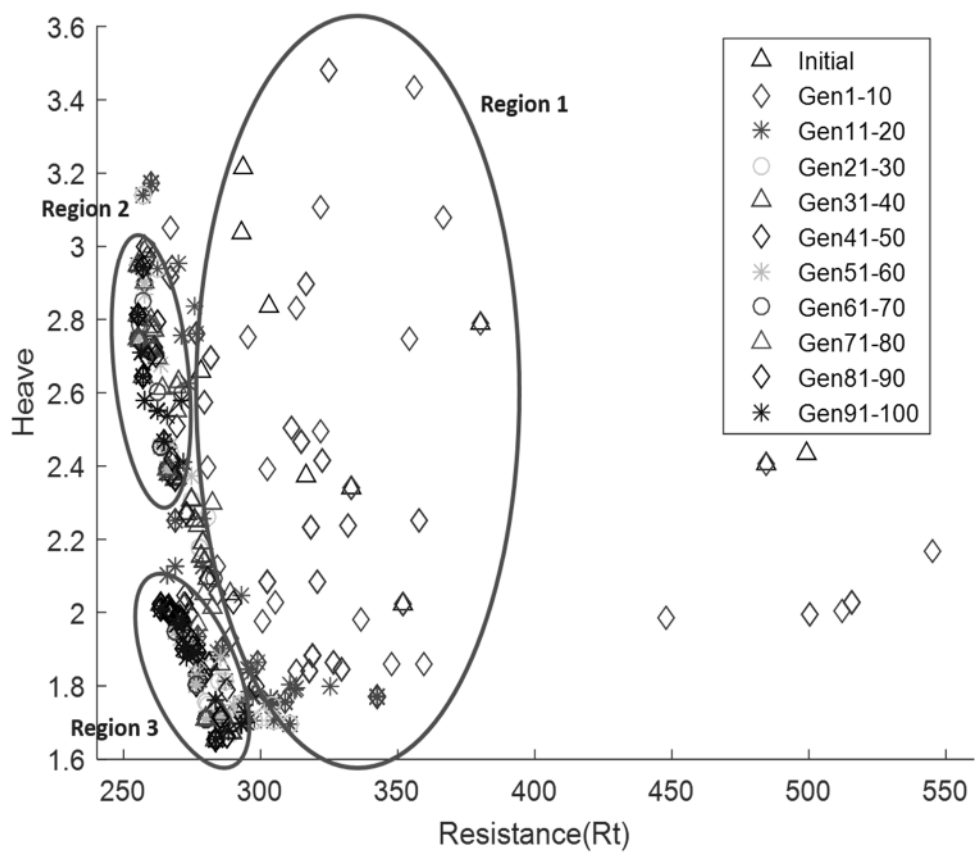


Figure 61

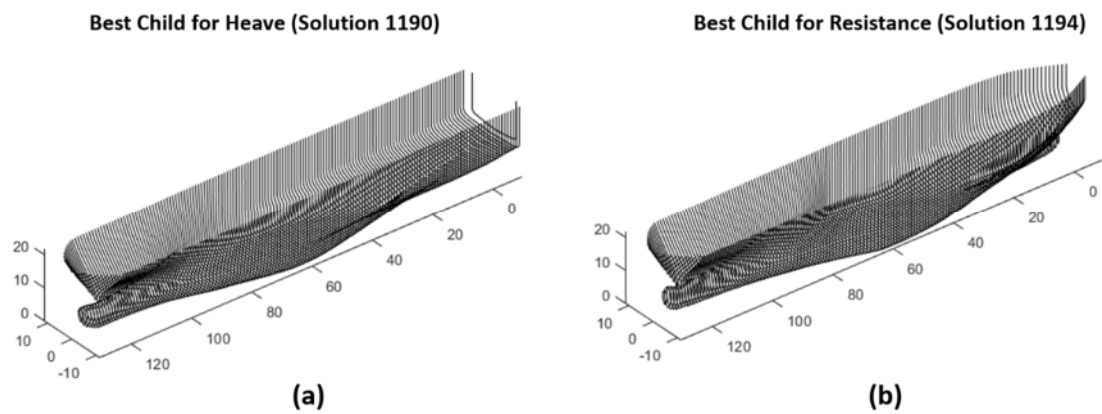


Figure 62

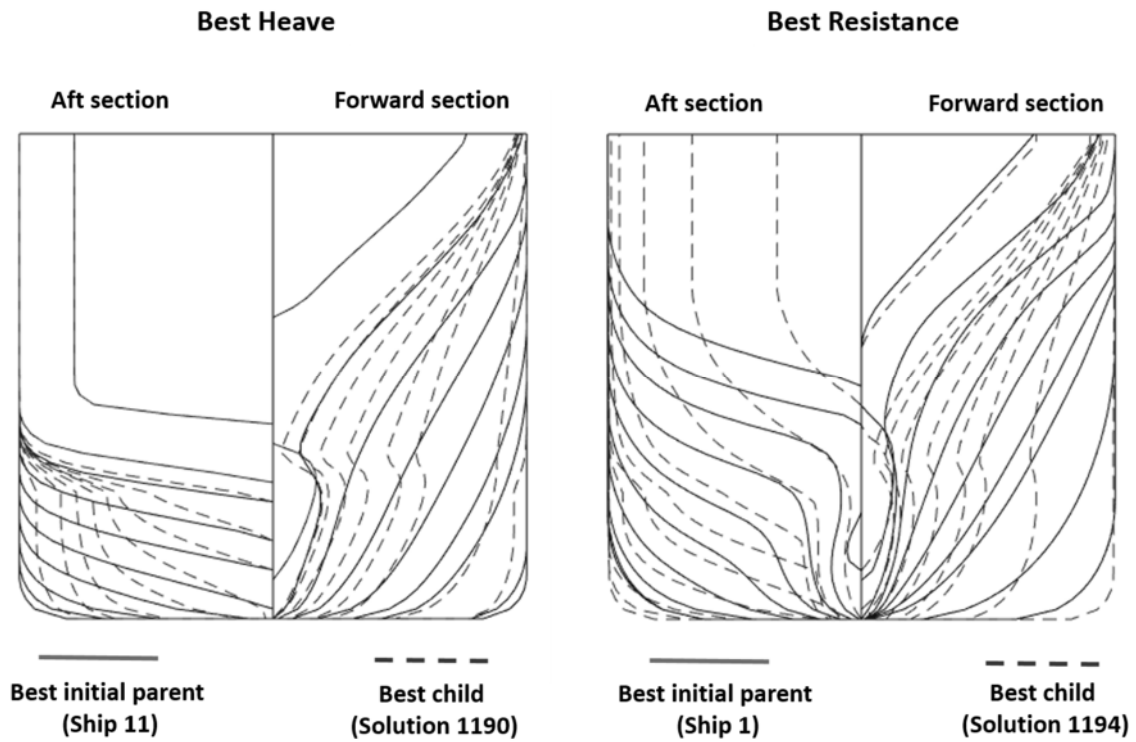


Figure 63(a)

Figure 63(b)

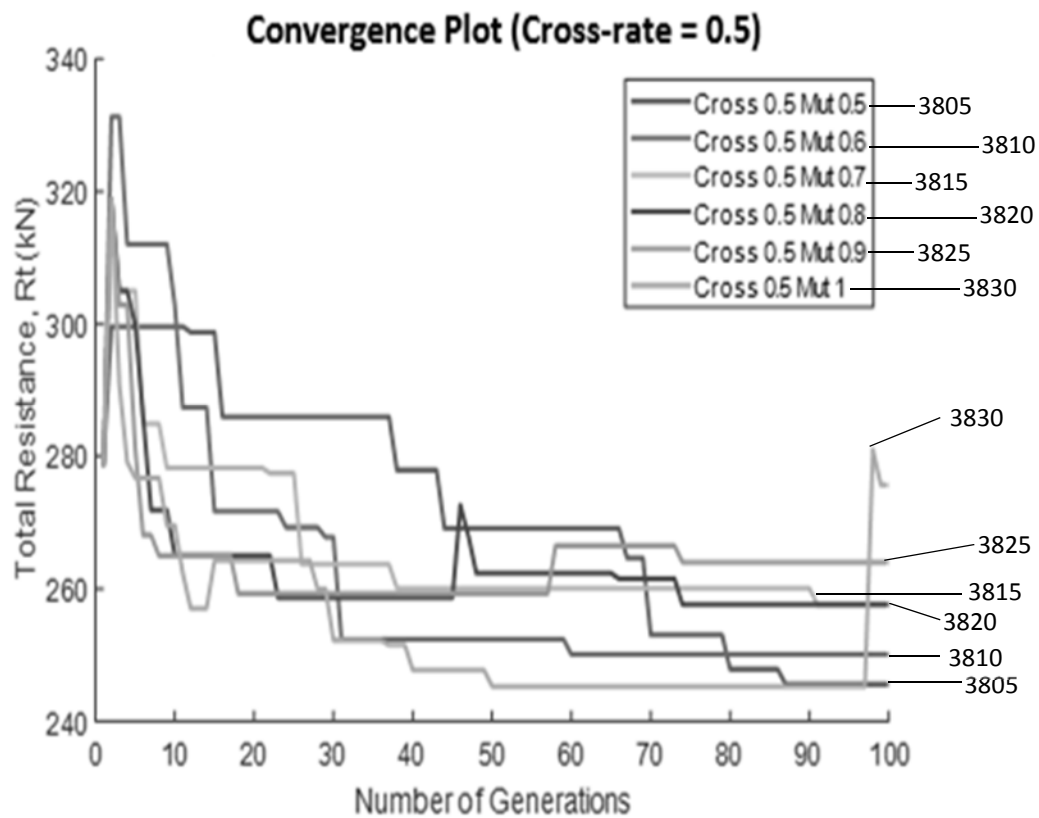


Figure 64(a)

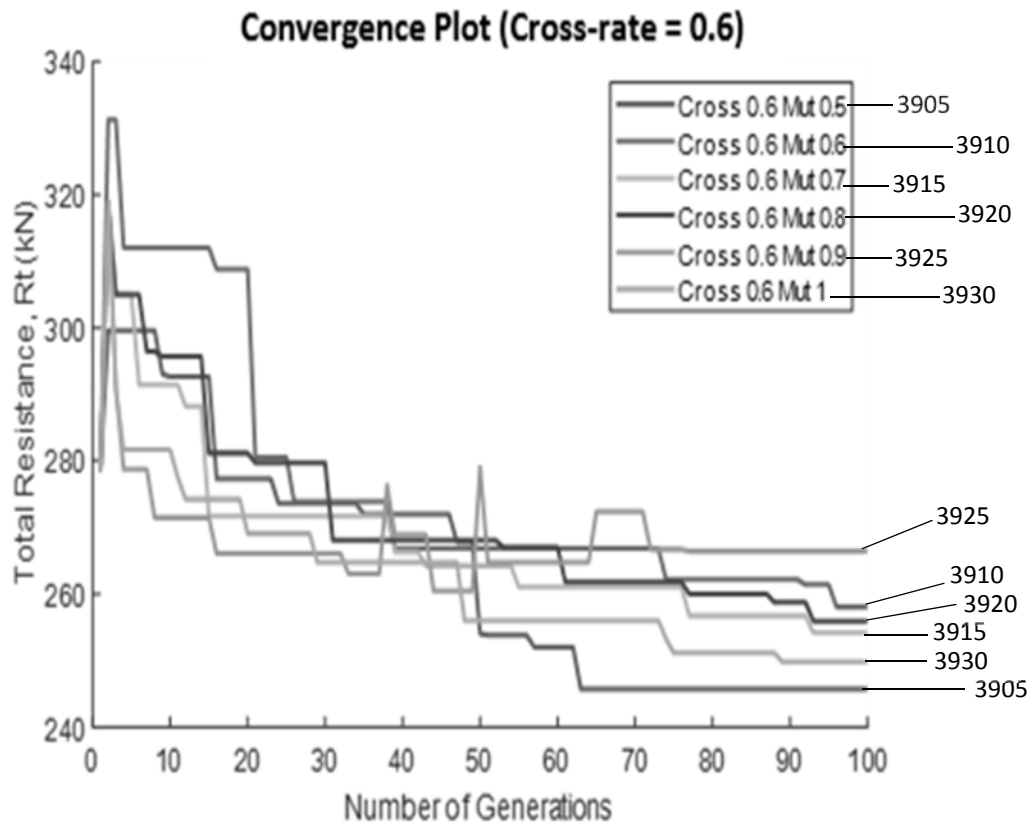


Figure 64(b)

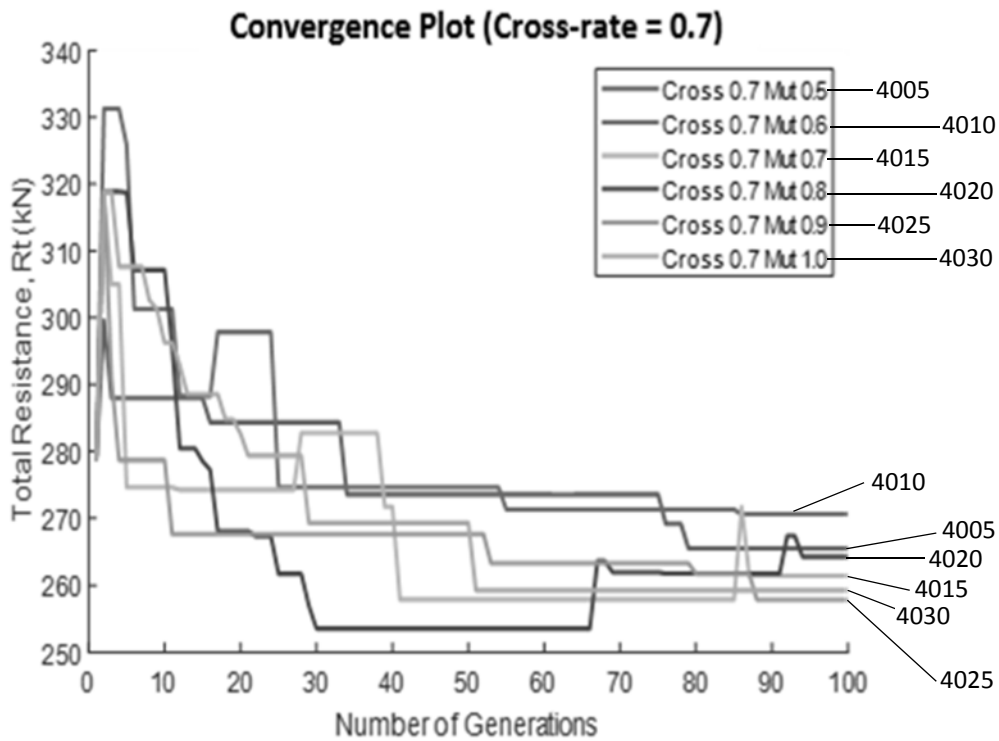


Figure 64(c)

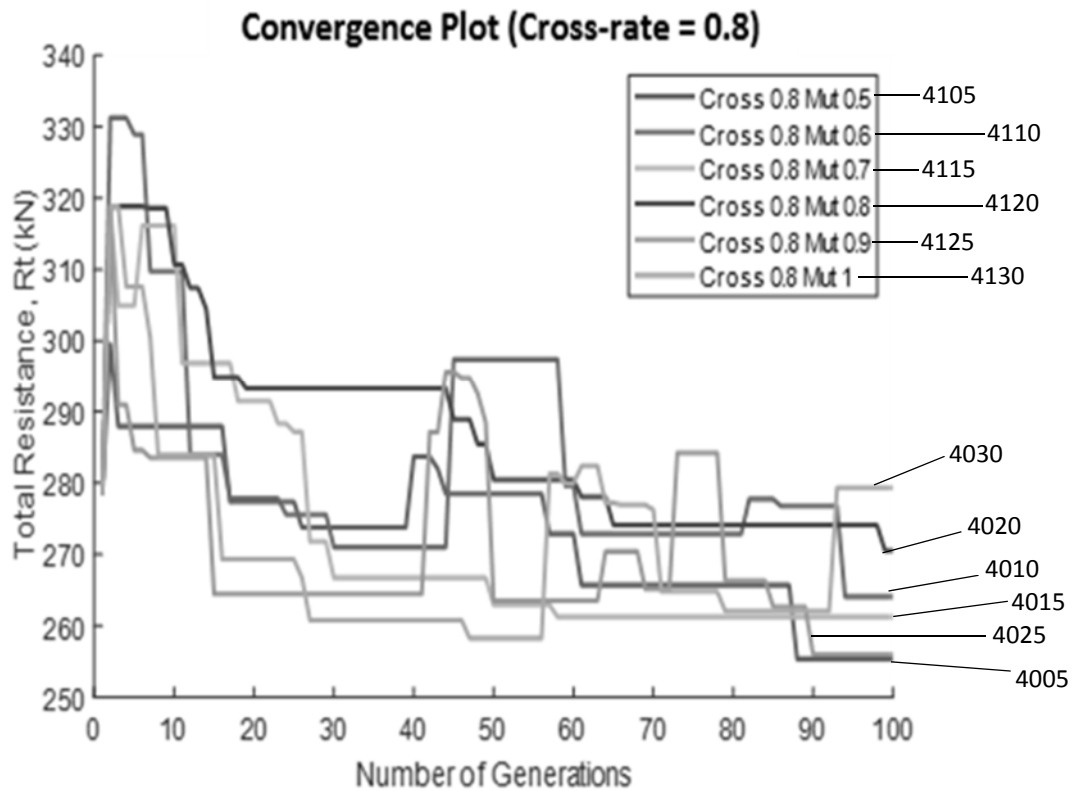


Figure 64(d)

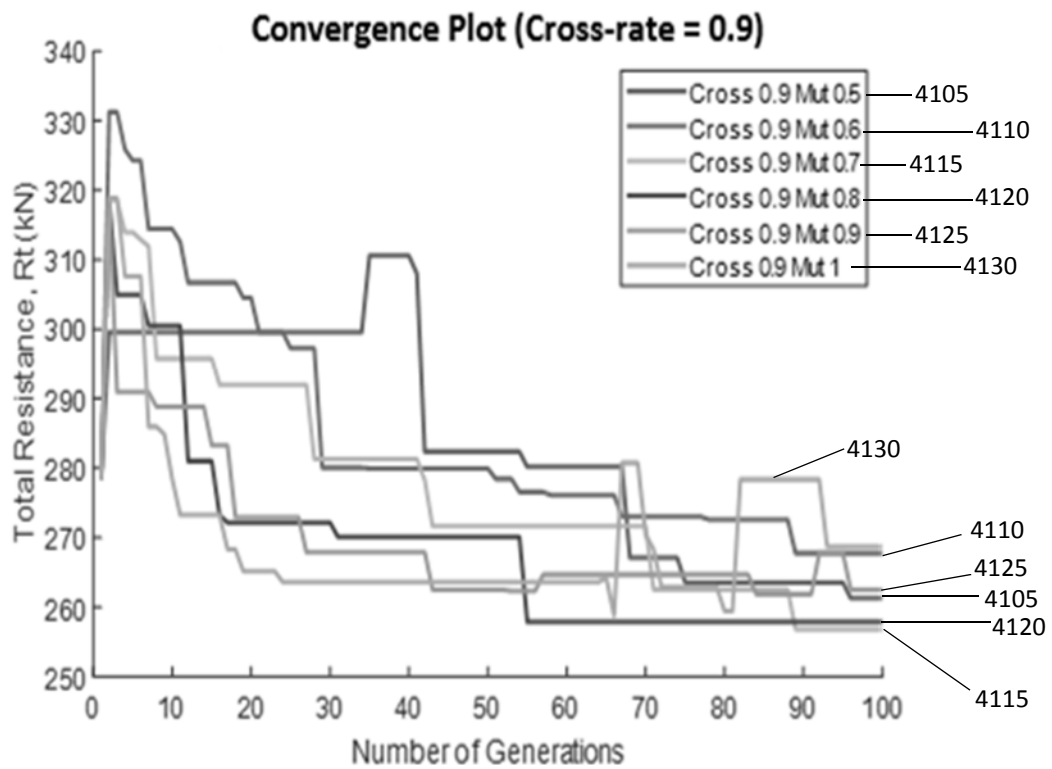


Figure 64(e)

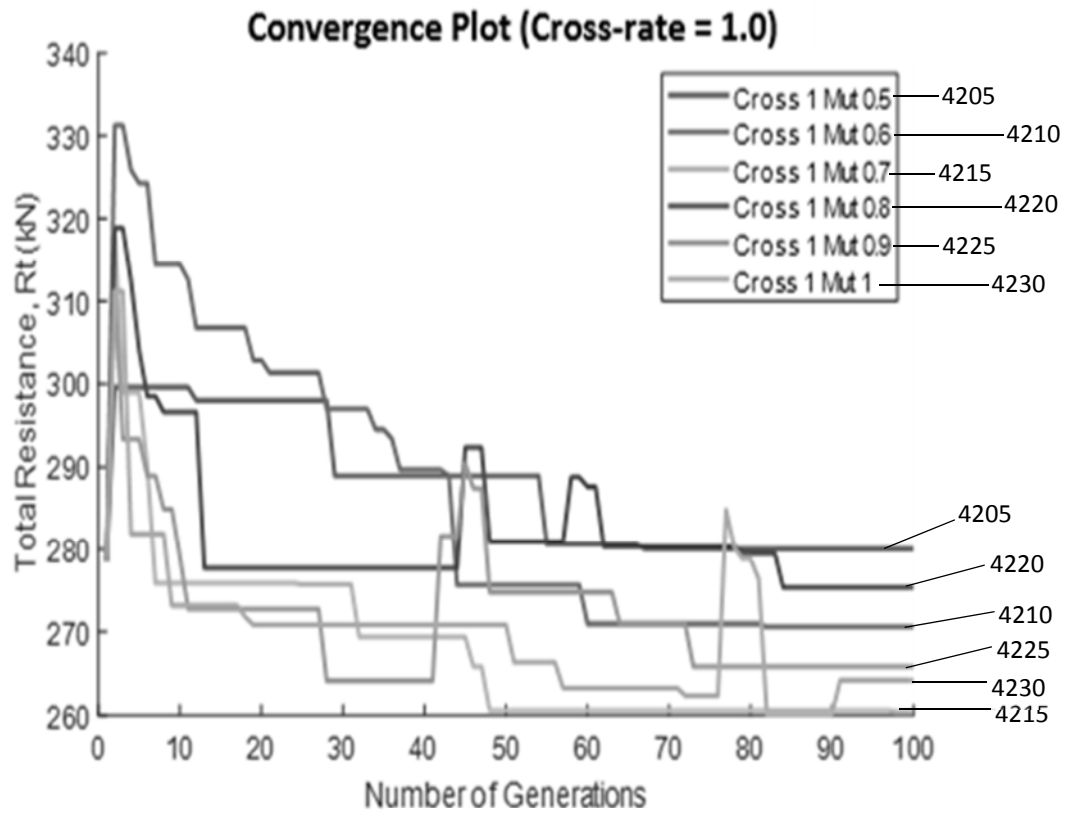


Figure 64(f)

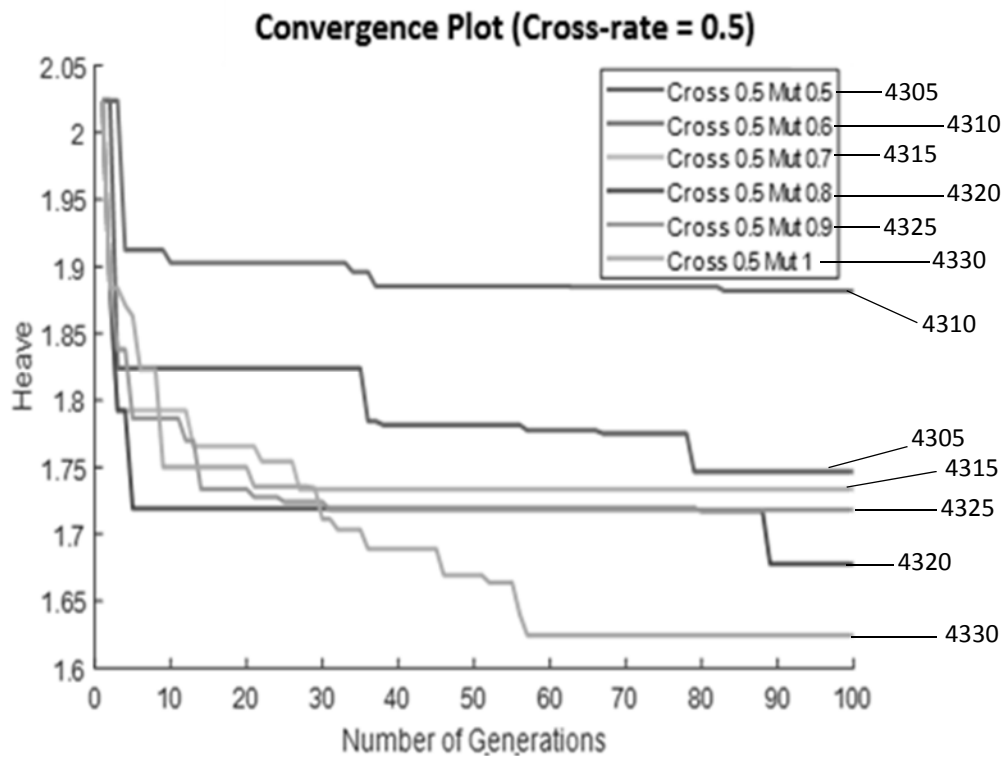


Figure 65(a)

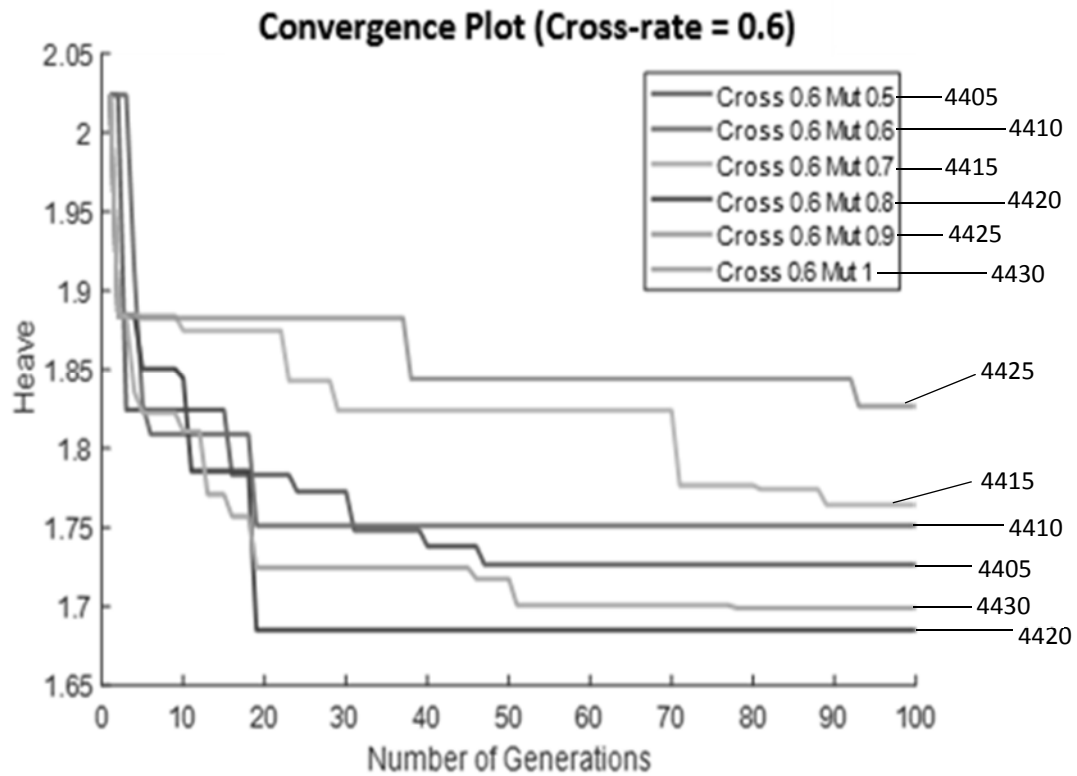


Figure 65(b)

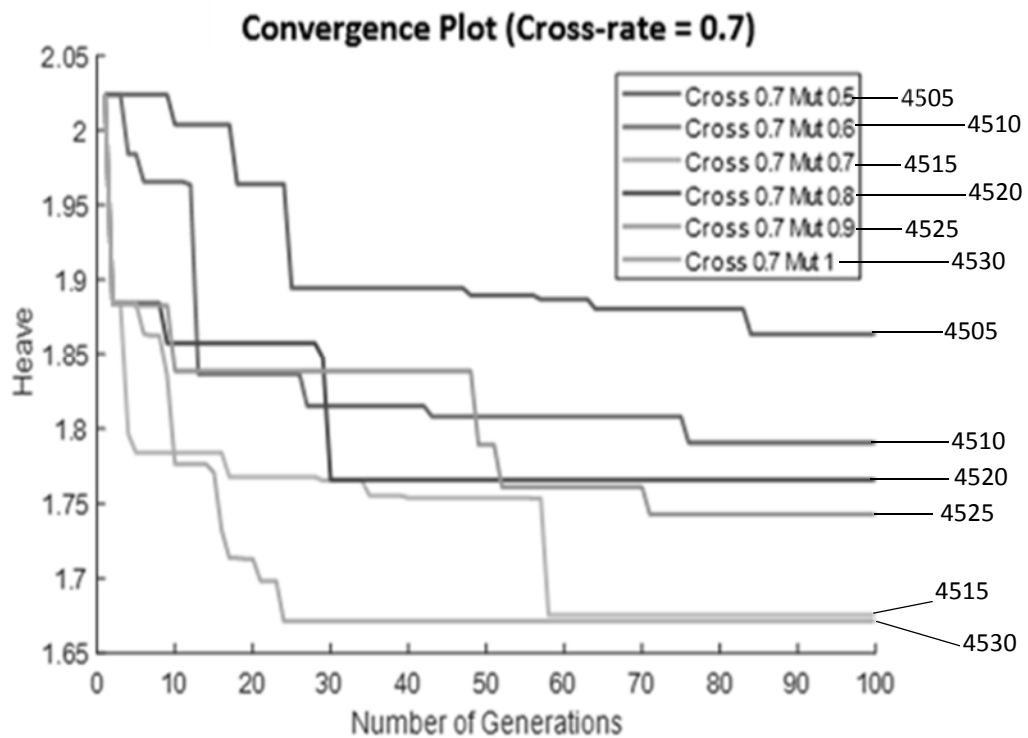


Figure 65(c)

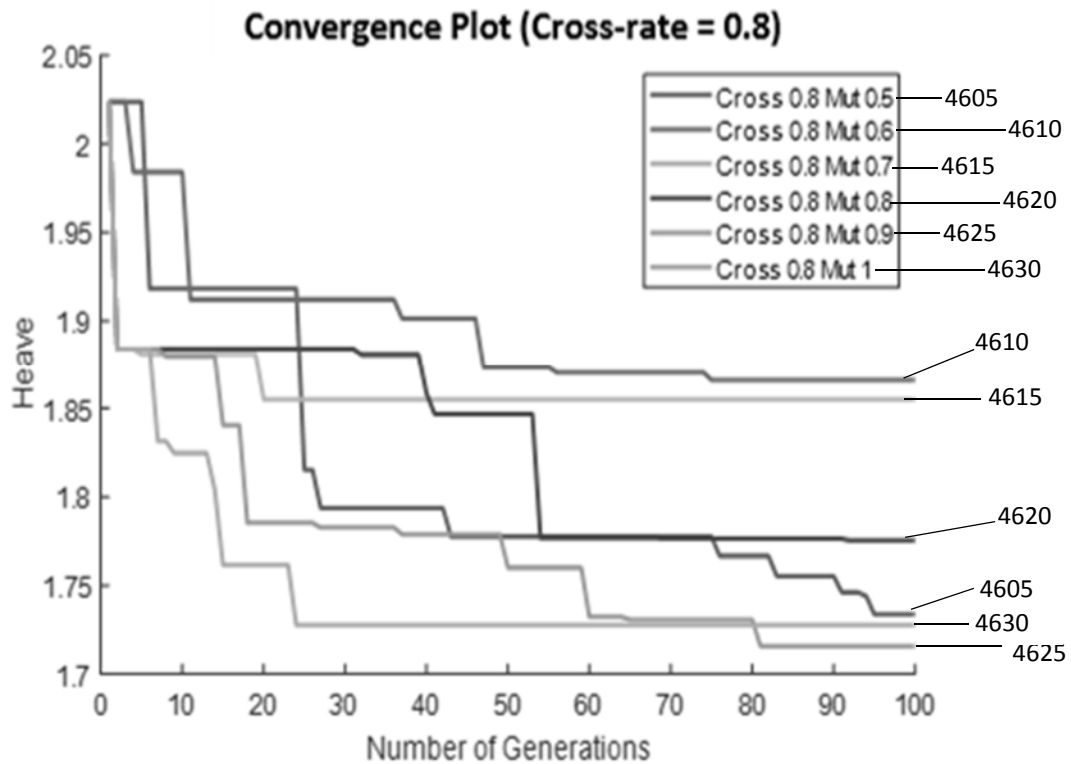


Figure 65(d)

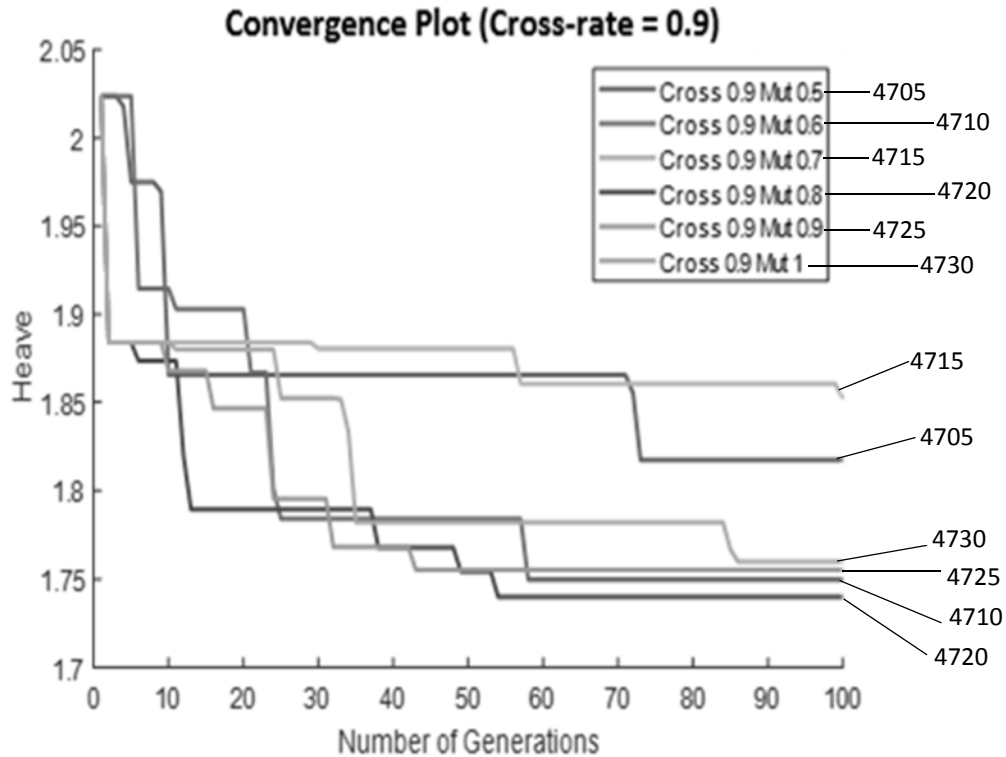


Figure 65(e)

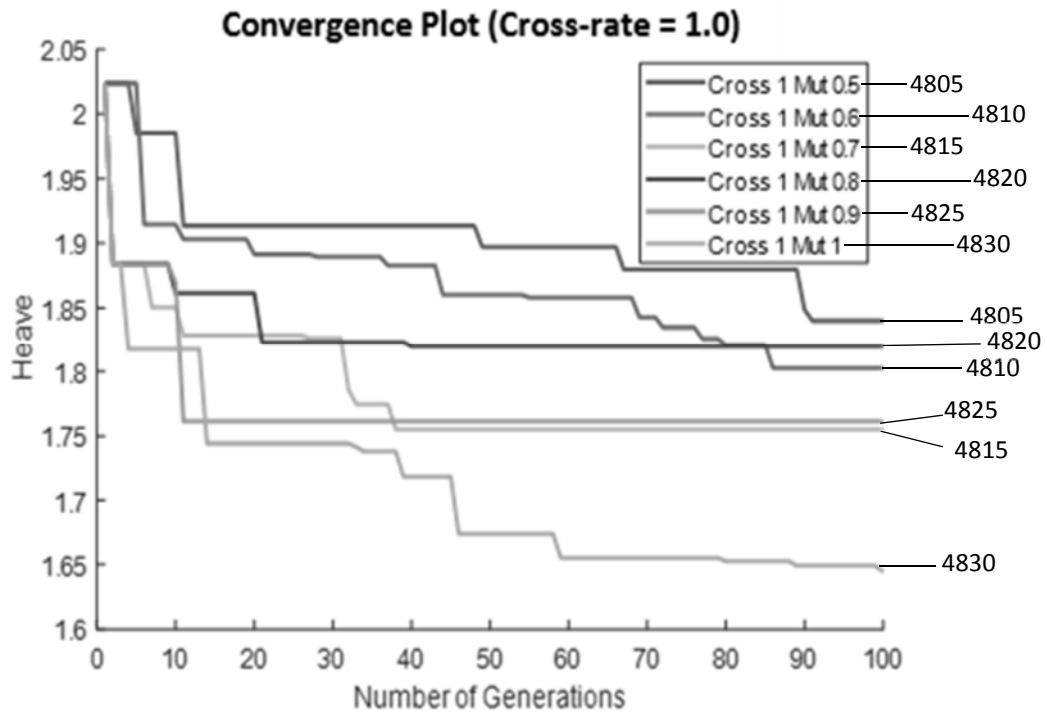


Figure 65(f)

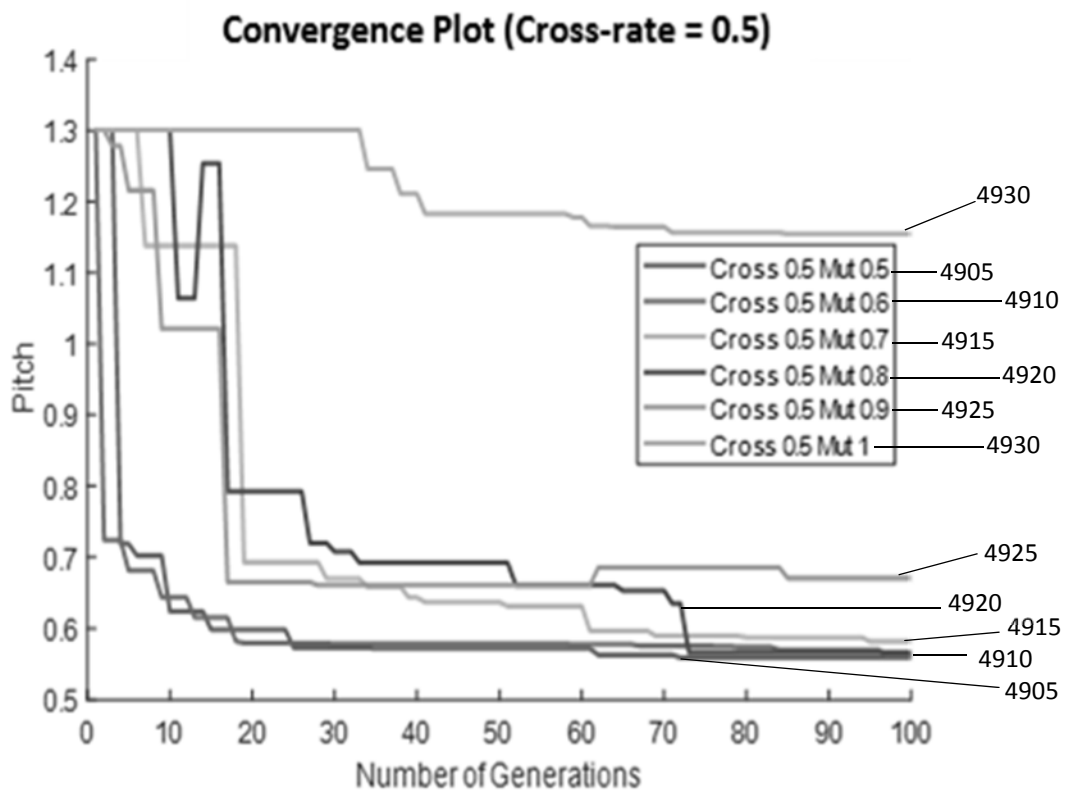


Figure 66(a)

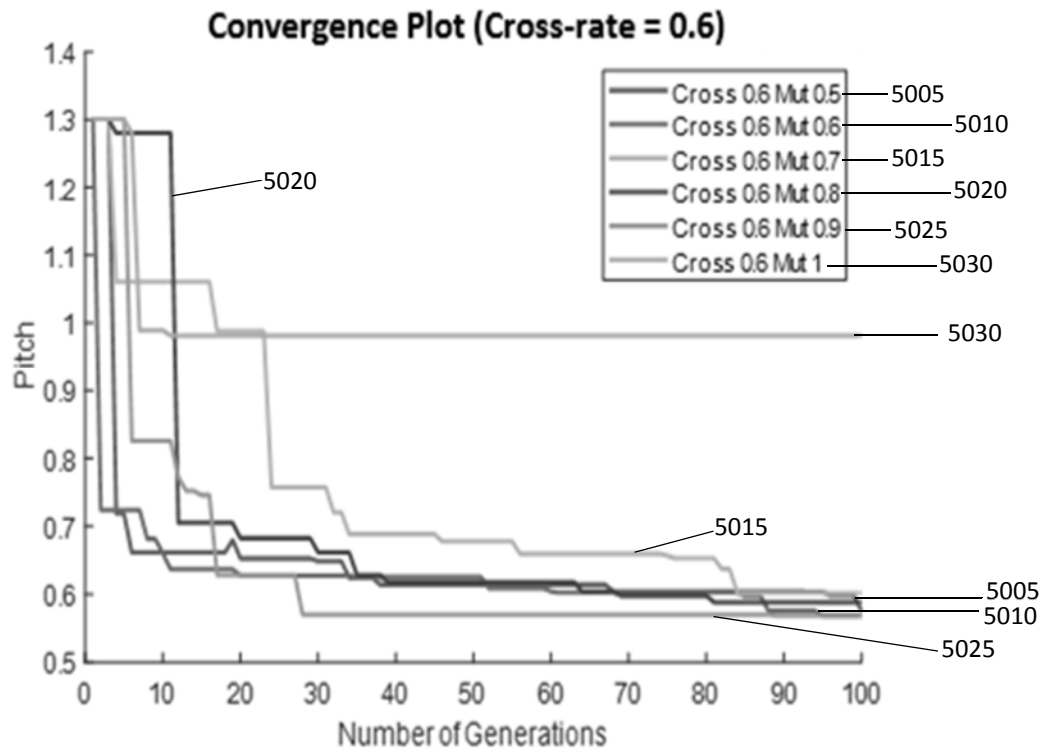


Figure 66(b)

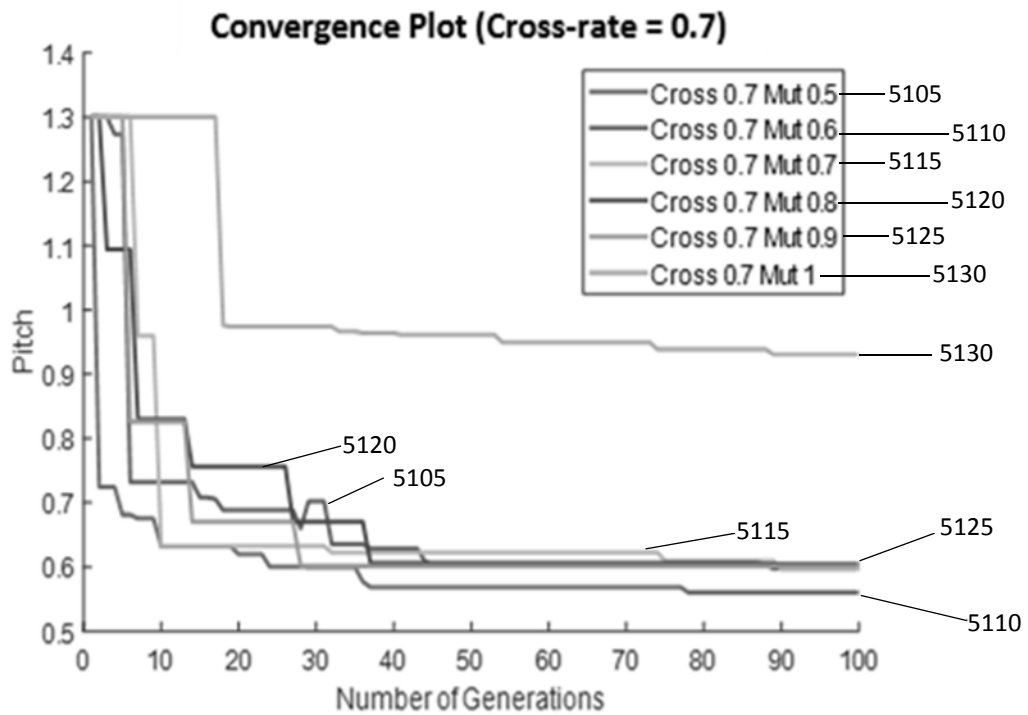


Figure 66(c)

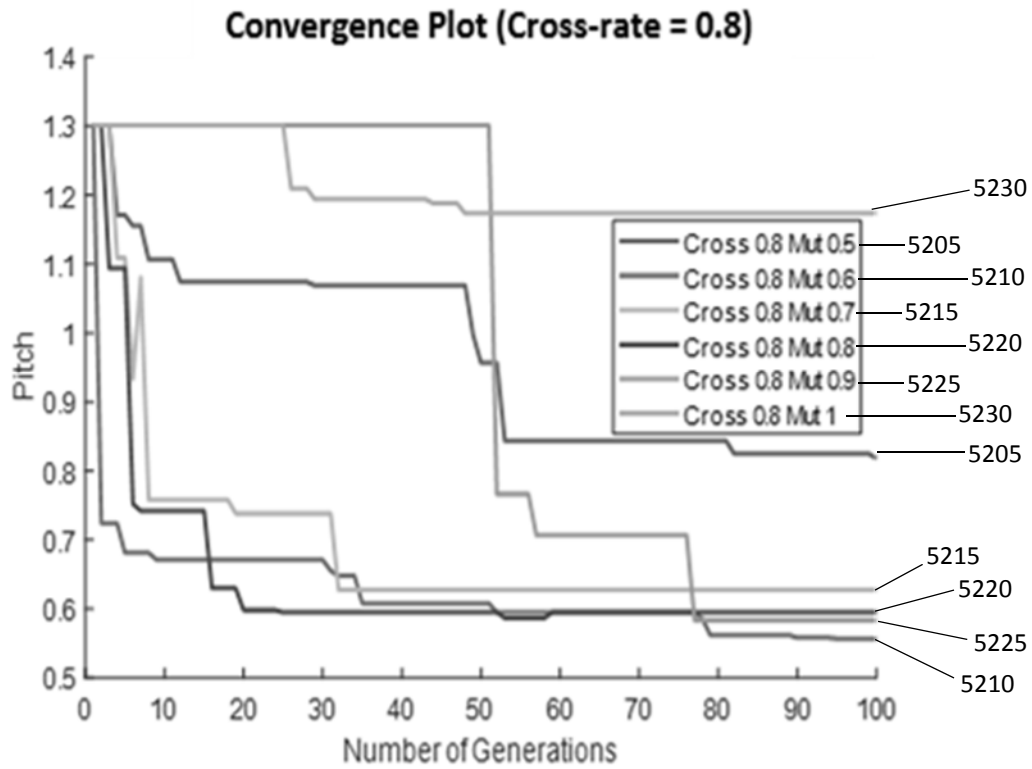


Figure 66(d)

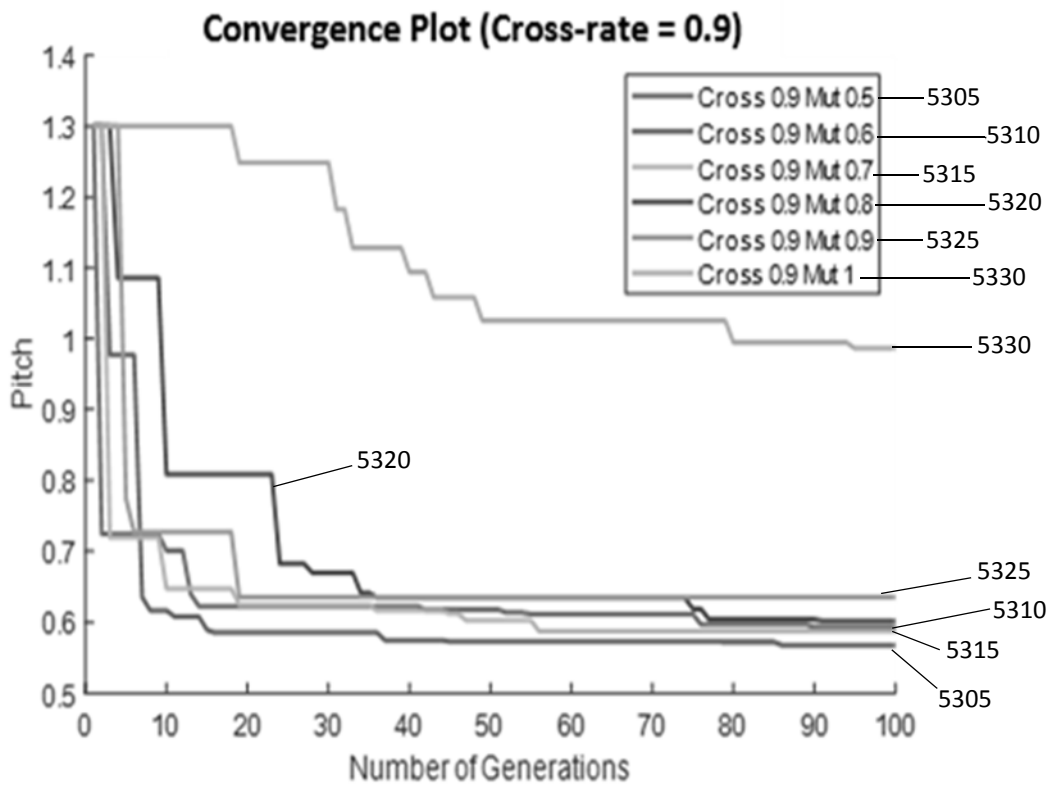


Figure 66(e)

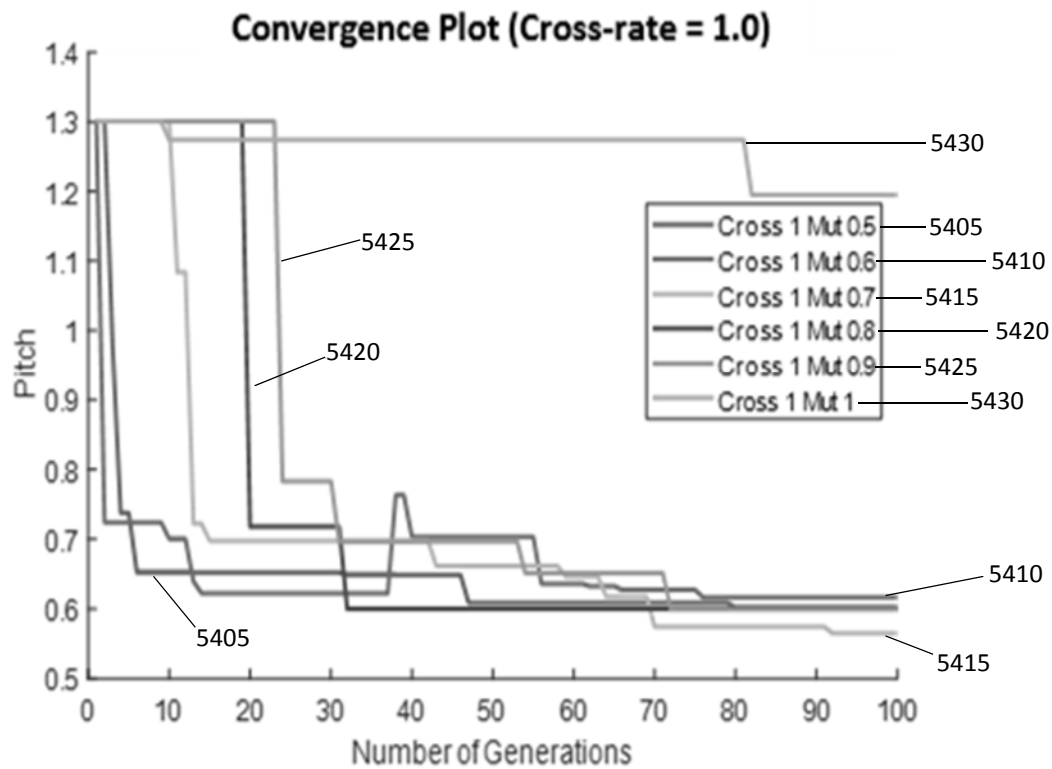


Figure 66(f)

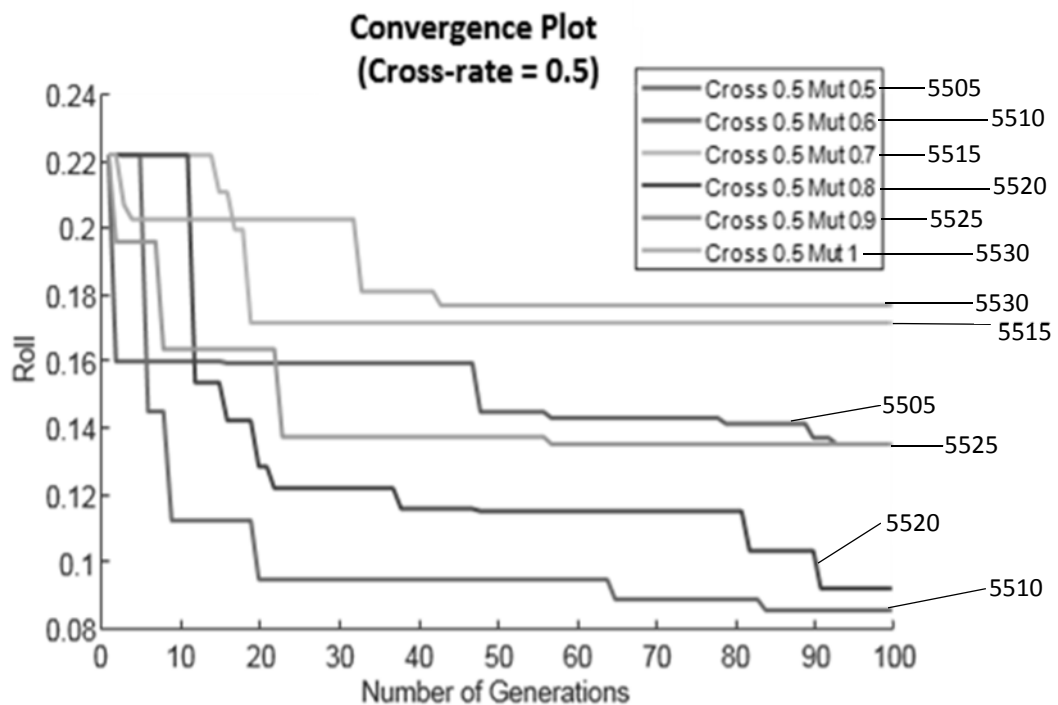


Figure 67(a)

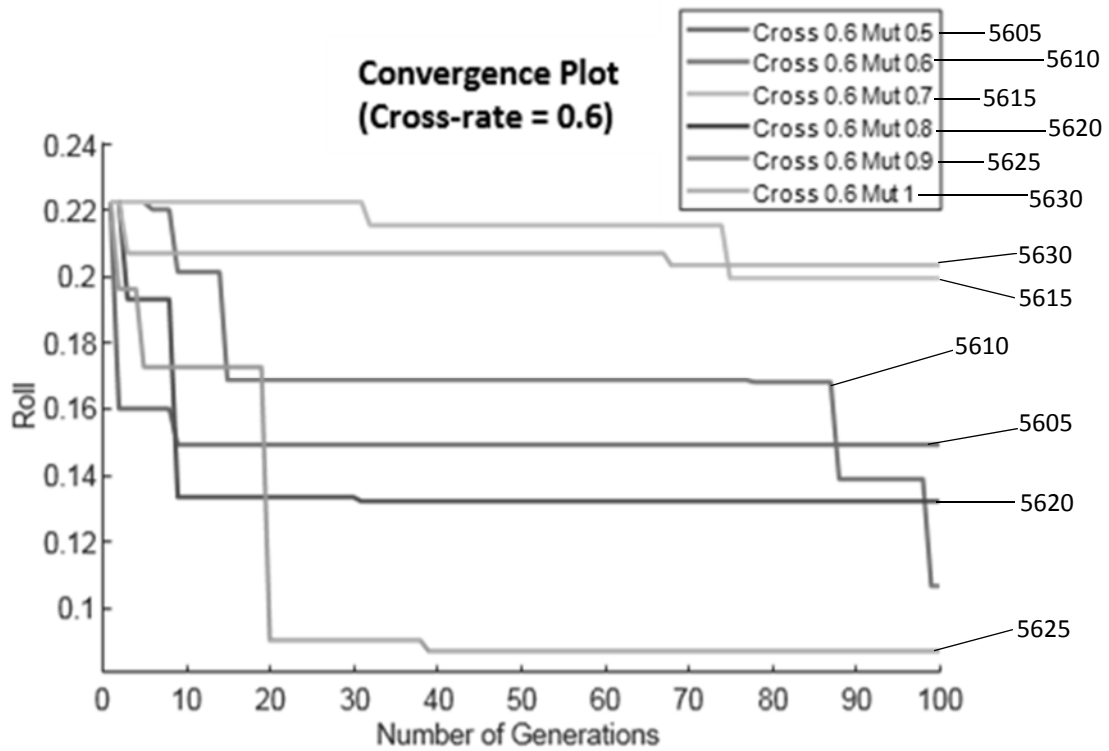


Figure 67(b)

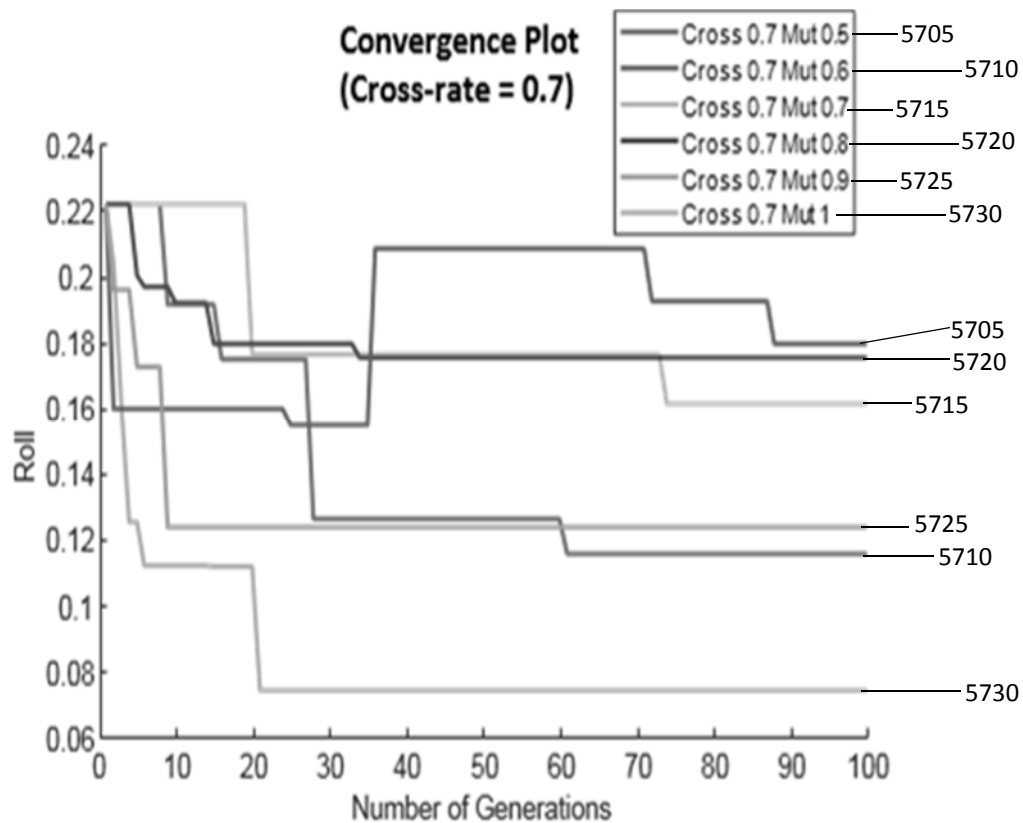


Figure 67(c)

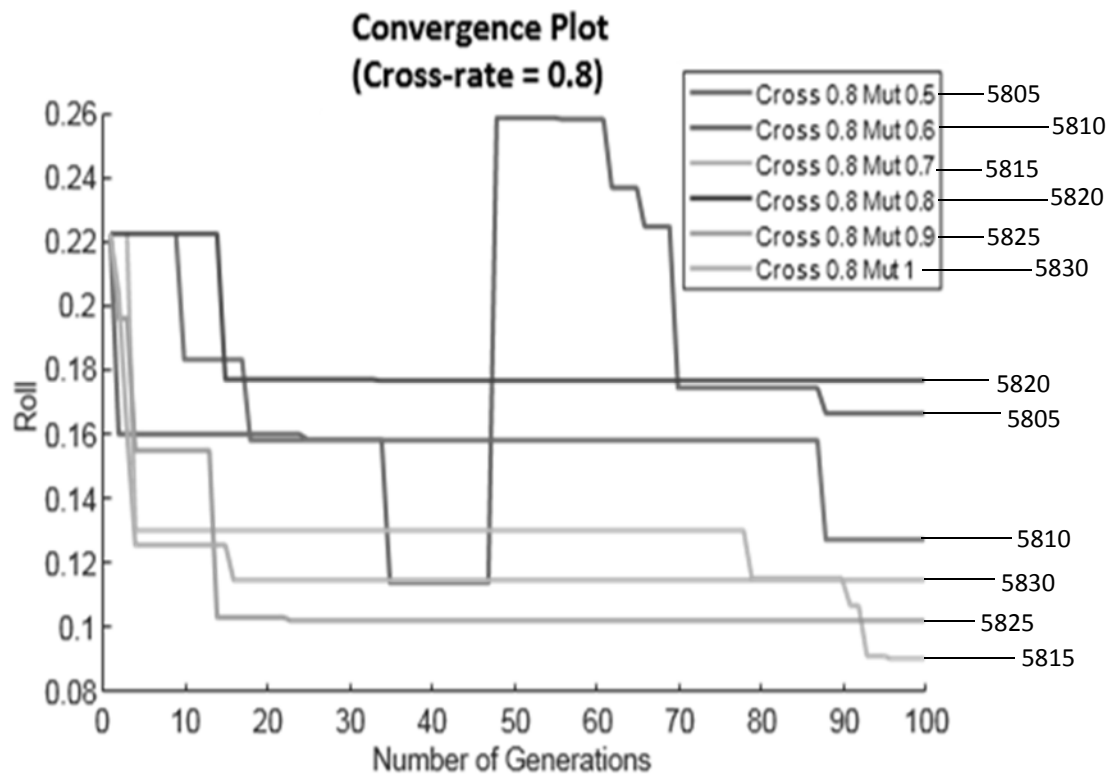


Figure 67(d)

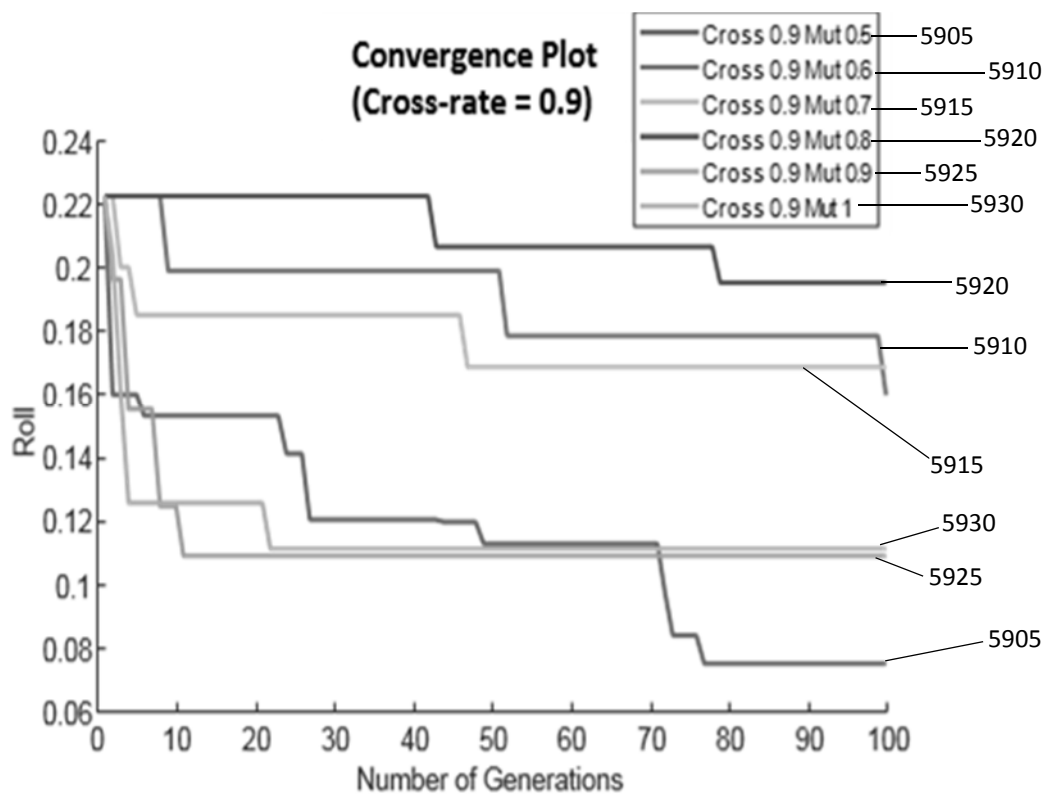


Figure 67(e)

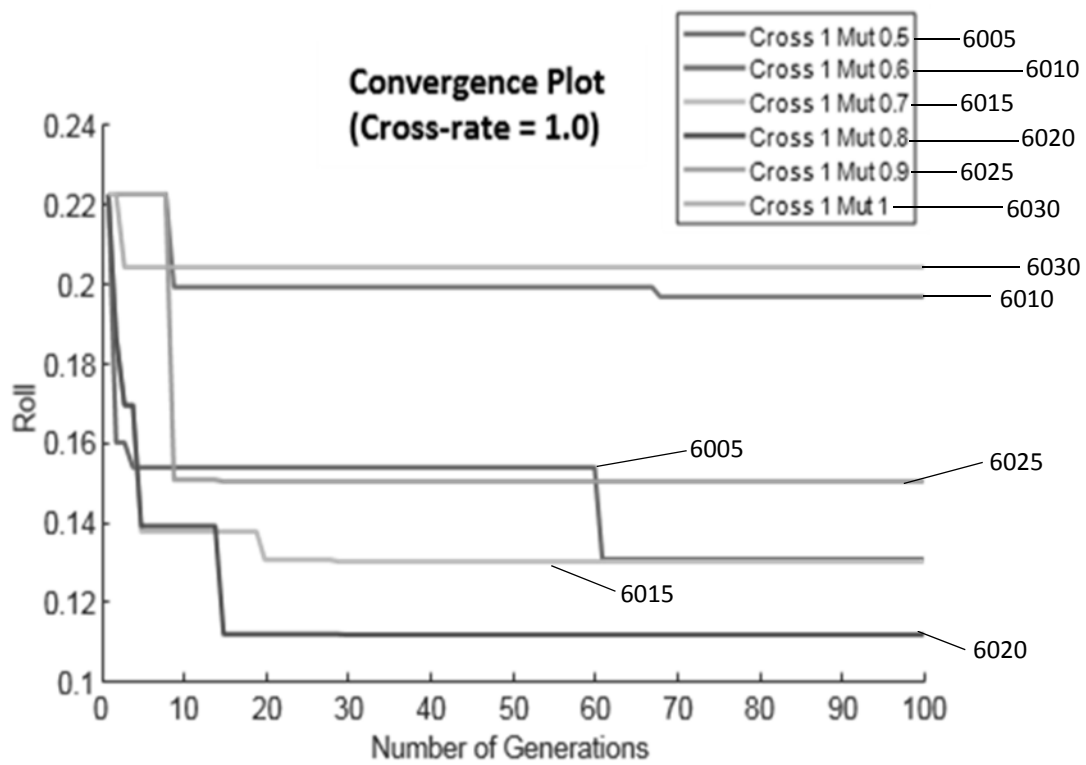


Figure 67(f)

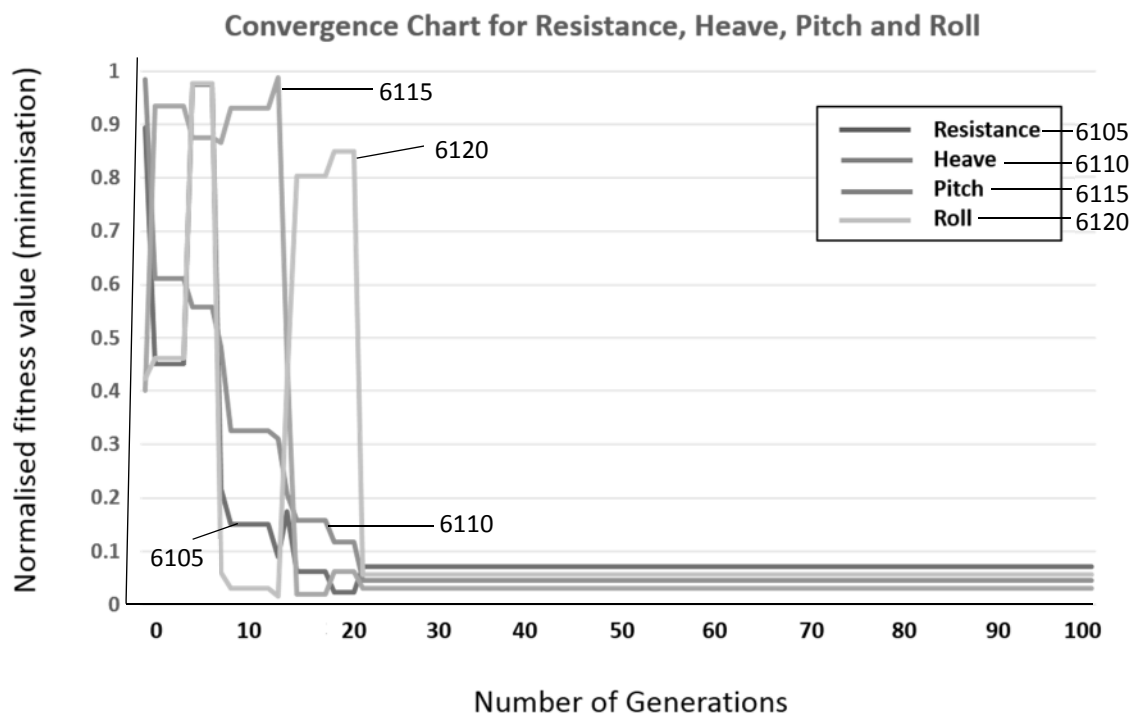


Figure 68

Solution Space For Heave and Resistance

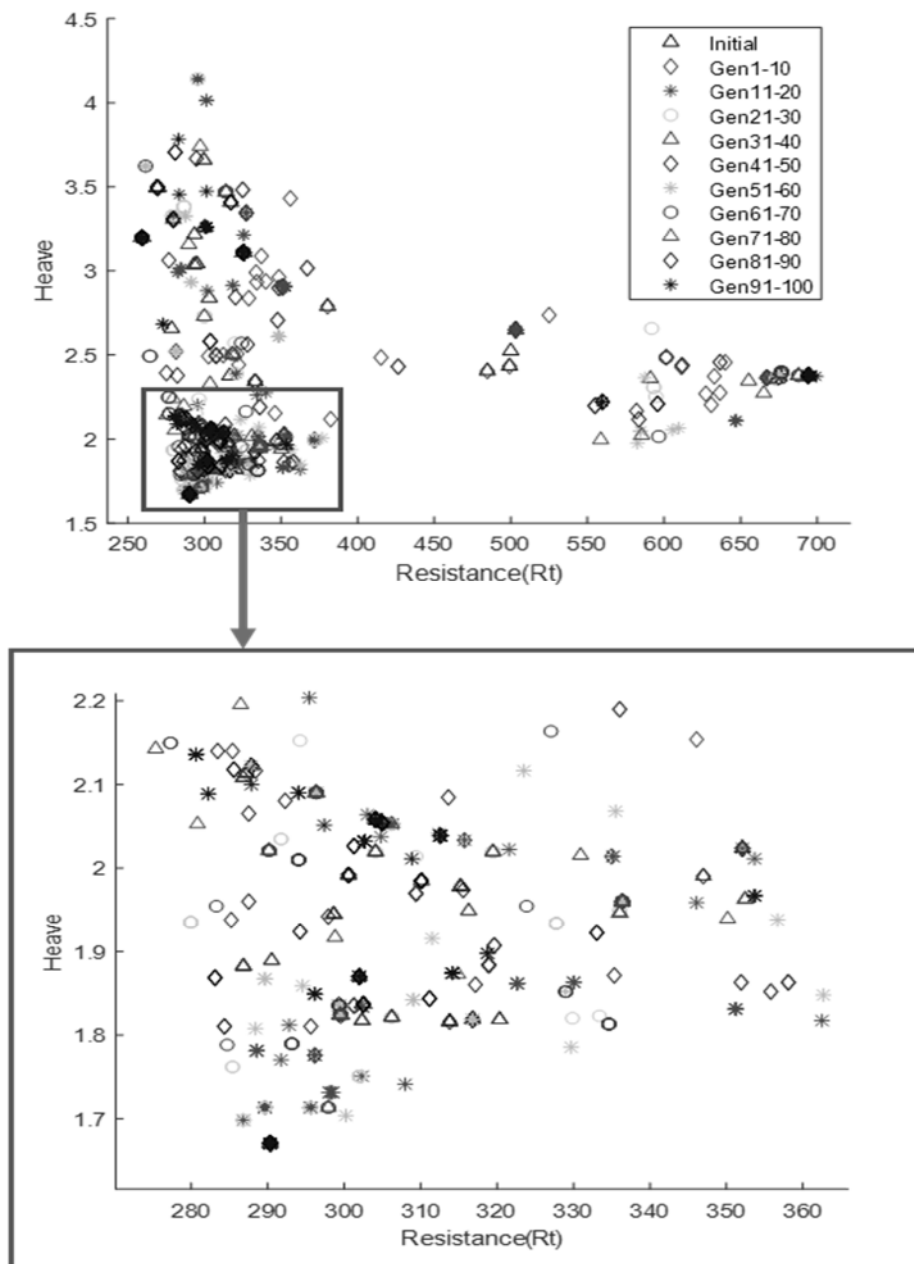


Figure 69

Solution Space For Pitch and Resistance

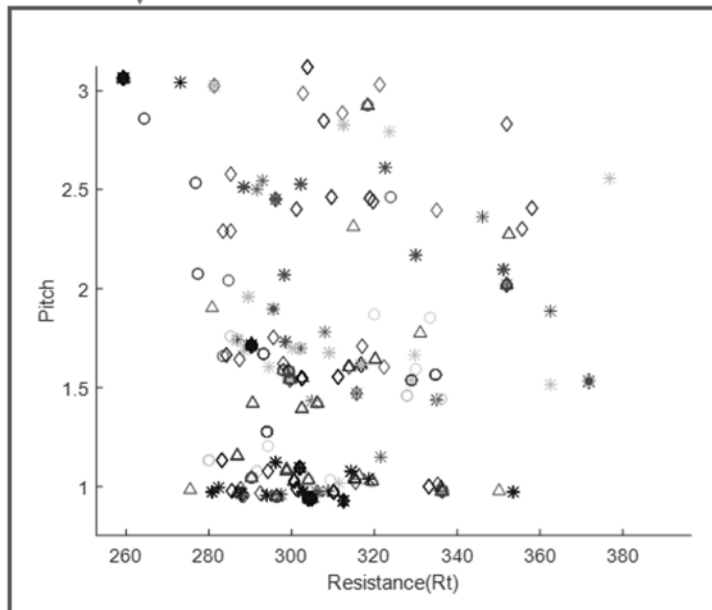
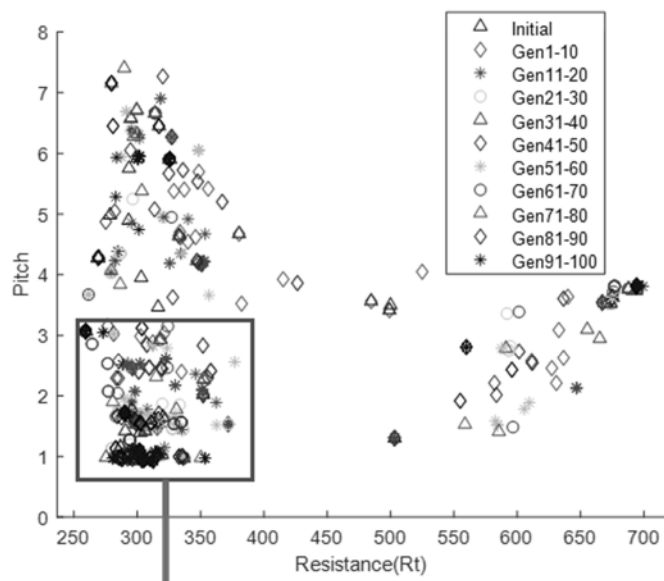


Figure 70

Solution Space For Roll and Resistance

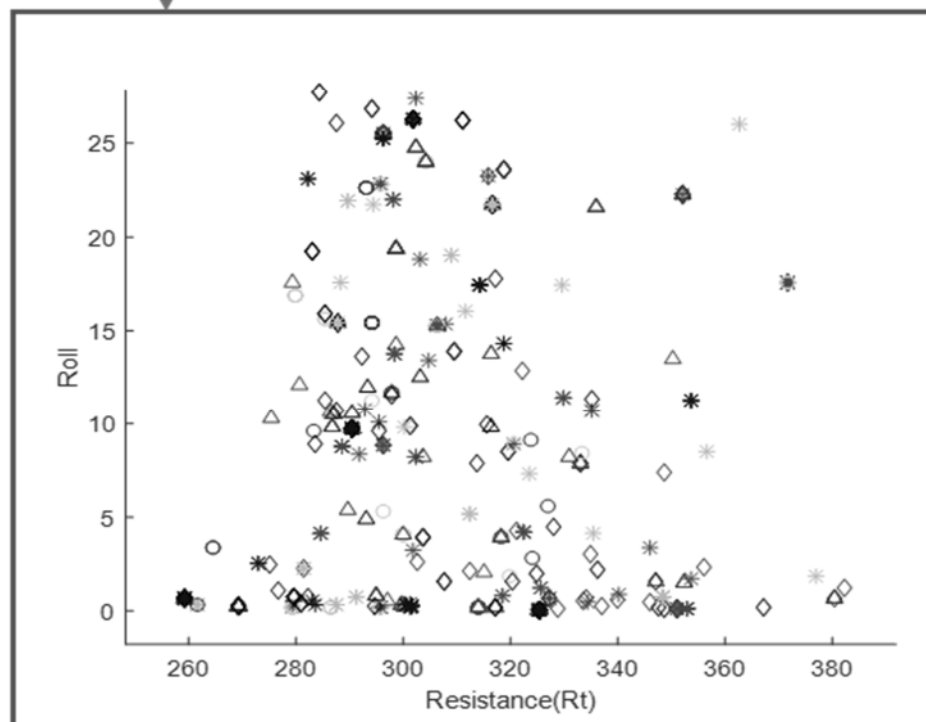
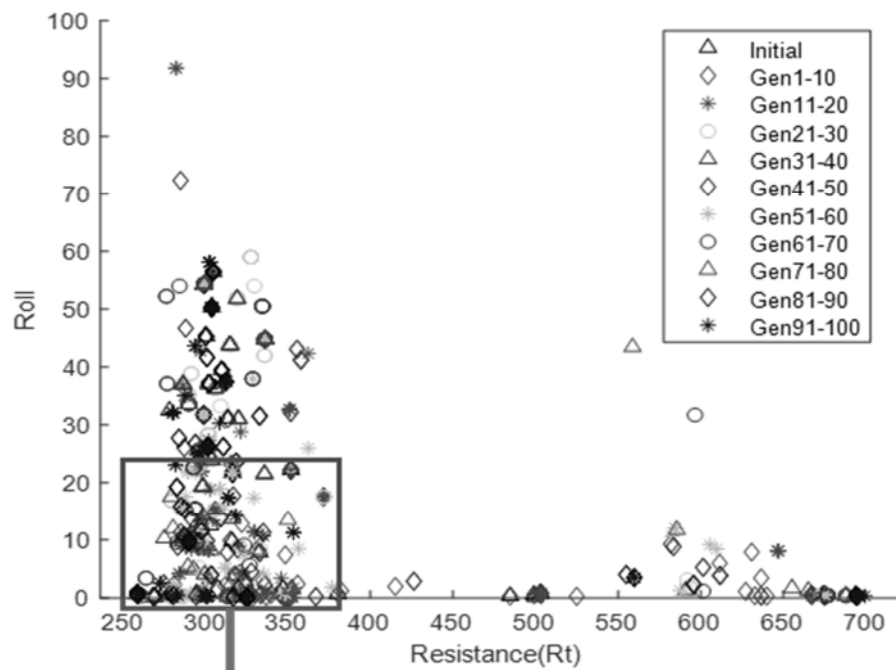


Figure 71

Solution Space For Heave and Pitch

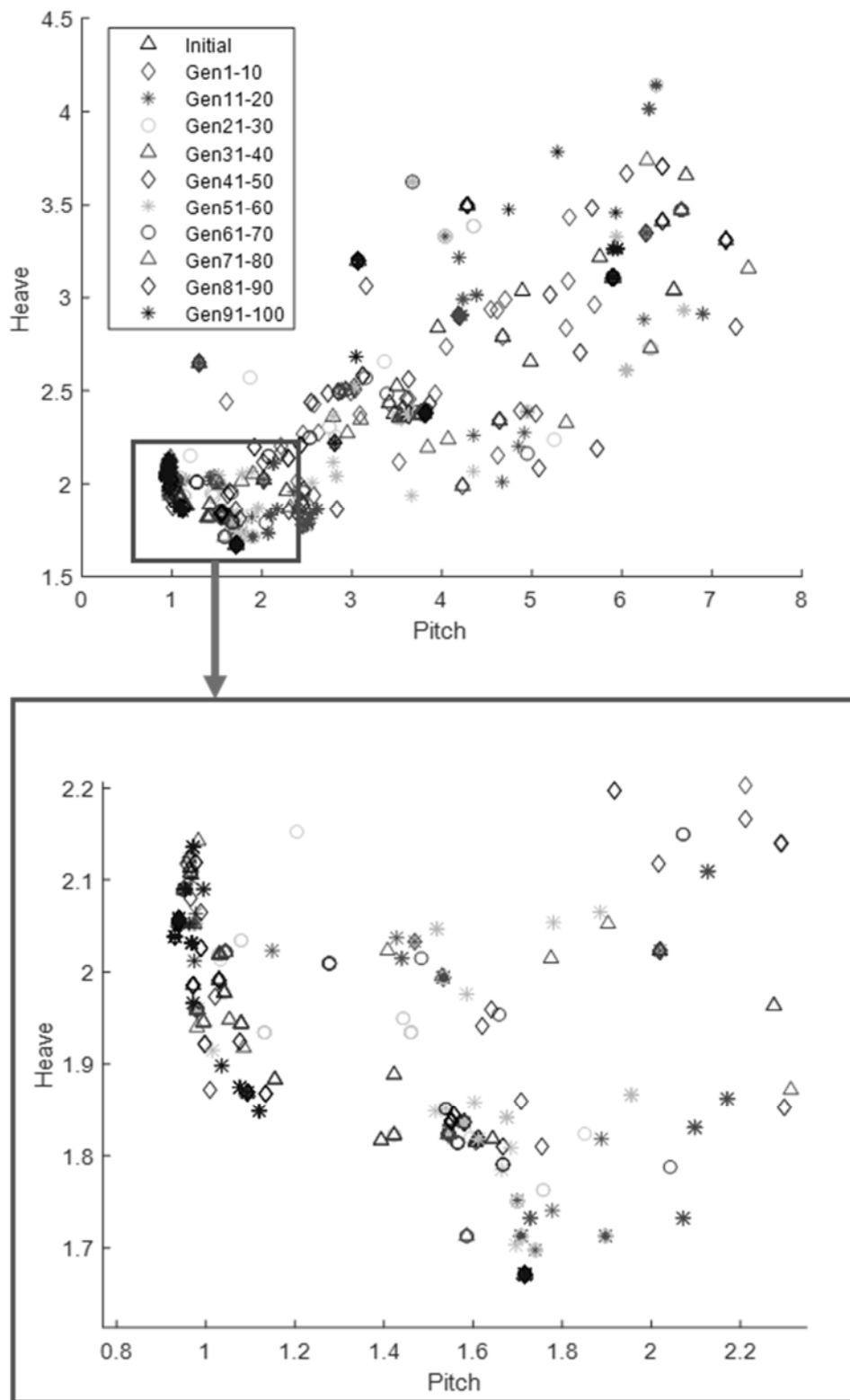


Figure 72

Solution Space For Heave and Roll

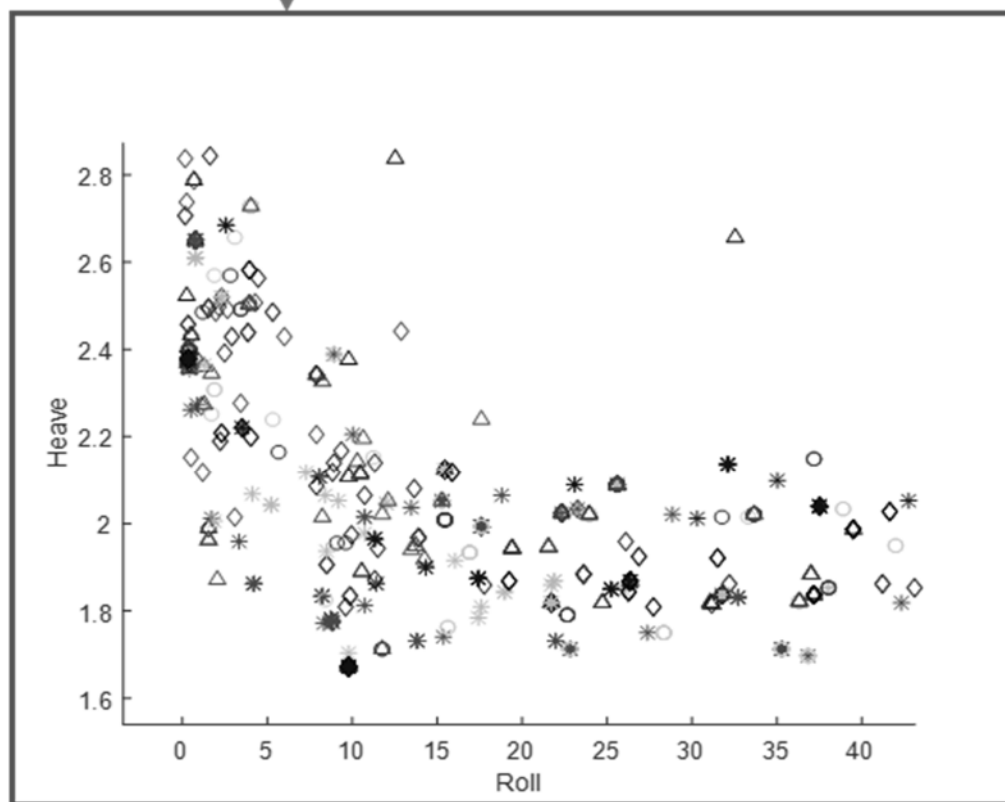
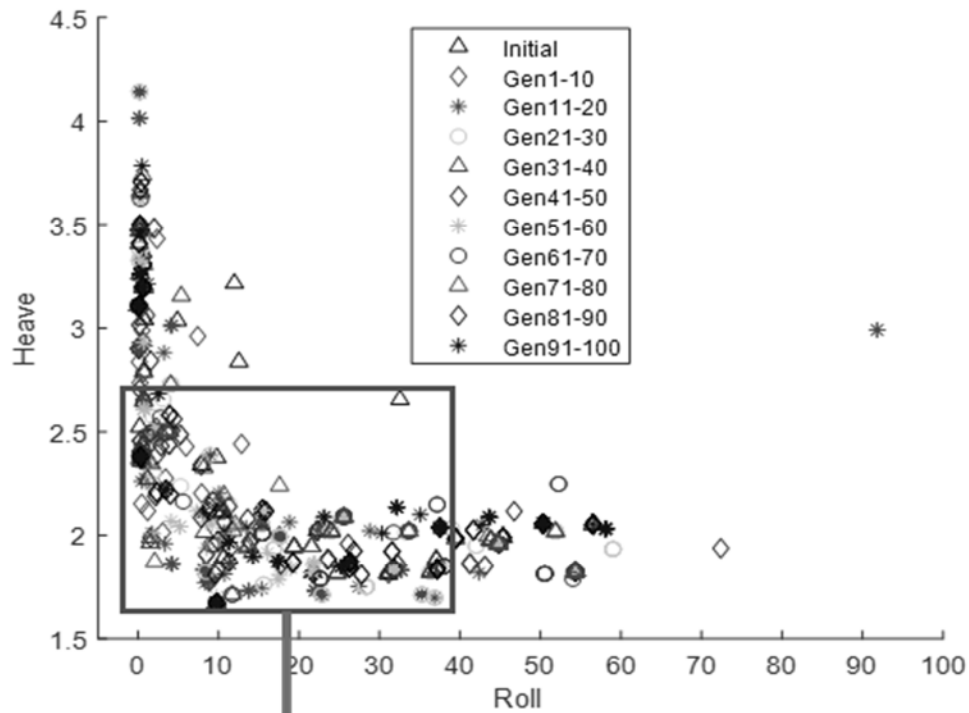


Figure 73

Solution Space For Roll and Pitch

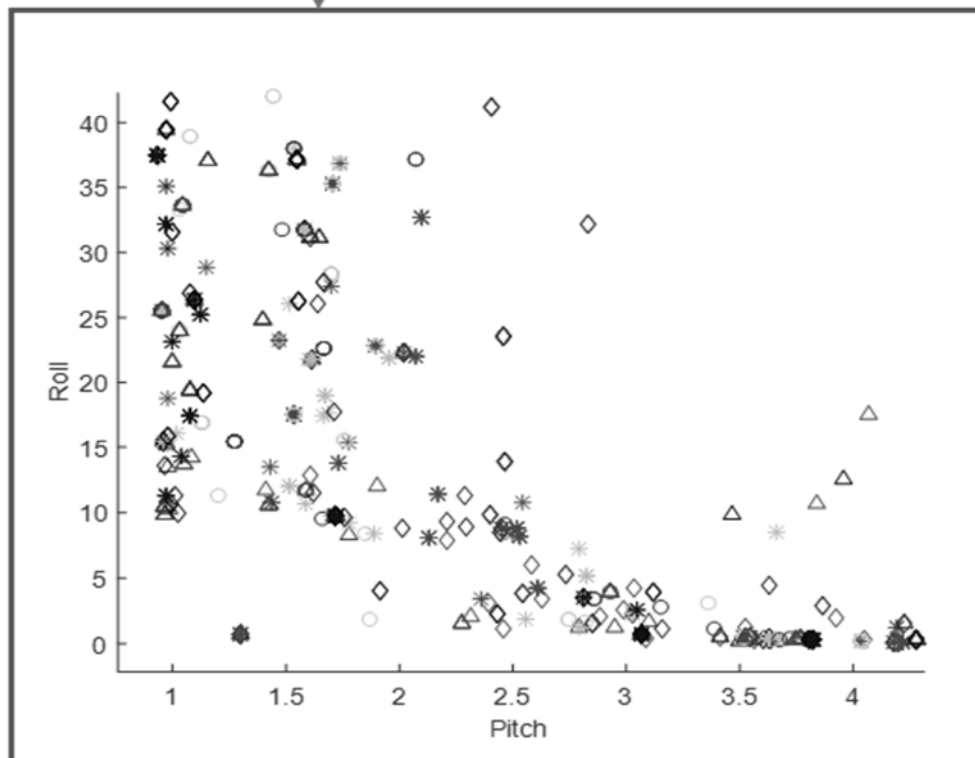
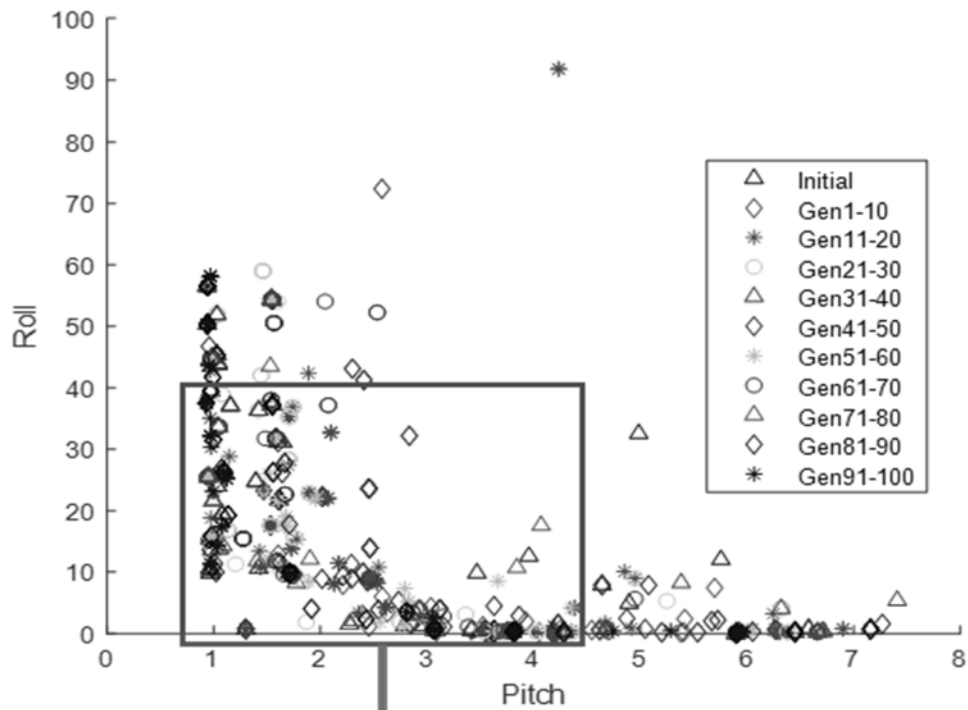


Figure 74

Parent Child	Ship 11 - Cable-laying Ship (Best heave) $R_t = 352$, Heave = 2.02, Pitch = 2.01, Roll = 22.28				Ship 1 - Container Ship A (Best resistance) $R_t = 278.5$, Heave = 2.65, Pitch = 4.98, Roll = 35.53				Ship 10 - Pipe-laying Ship (Best pitch) $R_t = 503.1$, Heave = 2.64, Pitch = 1.3, Roll = 0.72				Ship 7 (Product Carrier) Best roll $R_t = 499.9$, Heave = 2.52, Pitch = 3.49, Roll = 0.22				Δ (tonnes)
	R_t	Heave	Pitch	Roll	R_t	Heave	Pitch	Roll	R_t	Heave	Pitch	Roll	R_t	Heave	Pitch	Roll	
1189	301.58 (14.33)	3.26 (-61.22)	5.95 (-194.8)	0.26 (98.83)	301.58 (-8.27)	3.26 (-22.84)	5.95 (-19.46)	0.26 (99.2)	301.58 (40.07)	3.26 (-23.15)	5.95 (-357.8)	0.26 (64.17)	301.58 (39.67)	3.26 (-29.27)	5.95 (-70.19)	0.26 (-17.75)	16097.62
1190	290.34 (17.53)	1.67 (17.43)	1.72 (15.07)	9.74 (56.27)	290.34 (-4.23)	1.67 (37.09)	1.72 (65.58)	9.74 (70.05)	290.34 (42.30)	1.67 (36.93)	1.72 (-31.91)	9.74 (-1235)	290.34 (41.92)	1.67 (33.80)	1.72 (50.97)	9.74 (-4288)	15156.84
1191	312.58 (11.21)	2.04 (-0.73)	0.93 (53.93)	37.51 (-68.36)	312.58 (-12.22)	2.04 (23.25)	0.93 (81.33)	37.51 (-15.29)	312.58 (37.88)	2.04 (23.06)	0.93 (28.45)	37.51 (-5040)	312.58 (37.47)	2.04 (19.24)	0.93 (73.41)	37.51 (-16792)	17299.19
1192	259.26 (26.36)	3.20 (-57.95)	3.07 (-51.86)	0.67 (97.01)	259.26 (6.93)	3.20 (-20.35)	3.07 (38.46)	0.67 (97.96)	259.26 (48.48)	3.20 (-20.65)	3.07 (-135.8)	0.67 (8.86)	259.26 (48.14)	3.20 (-26.65)	3.07 (12.33)	0.67 (-199.53)	15078.35
1193	325.49 (7.55)	3.11 (-53.57)	5.90 (-192.1)	0.07 (99.67)	325.49 (-16.85)	3.11 (-17.01)	5.90 (-18.39)	0.07 (99.77)	325.49 (35.32)	3.11 (-17.30)	5.90 (-353.7)	0.07 (89.88)	325.49 (34.89)	3.11 (-23.13)	5.90 (-68.65)	0.07 (66.75)	16781.44
1194	699.21 (-98.61)	2.37 (-17.24)	3.81 (-88.60)	0.30 (98.66)	699.21 (-151.0)	2.37 (10.67)	3.81 (23.58)	0.30 (99.08)	699.21 (-38.95)	2.37 (10.44)	3.81 (-192.9)	0.30 (58.94)	699.21 (-39.87)	2.37 (5.99)	3.81 (-8.87)	0.30 (-34.95)	21950.36
1195	302.69 (14.02)	2.03 (-0.37)	0.97 (51.98)	58.10 (-160.7)	302.69 (-8.67)	2.03 (23.52)	0.97 (80.54)	58.10 (-78.56)	302.69 (39.85)	2.03 (23.33)	0.97 (25.42)	58.10 (-7861)	302.69 (39.45)	2.03 (19.52)	0.97 (72.28)	58.10 (-26062)	16836.64
1196	282.30 (19.81)	2.09 (-3.22)	1.00 (50.73)	23.11 (-3.73)	282.30 (-1.35)	2.09 (21.35)	1.00 (80.03)	23.11 (28.97)	282.30 (43.90)	2.09 (21.15)	1.00 (23.48)	23.11 (-3067)	282.30 (43.53)	2.09 (17.24)	1.00 (71.56)	23.11 (-10307)	15918.61
1197	304.11 (13.62)	2.06 (-1.67)	0.94 (53.42)	50.32 (-125.8)	304.11 (-9.18)	2.06 (22.54)	0.94 (81.13)	50.32 (-54.55)	304.11 (39.56)	2.06 (22.34)	0.94 (27.66)	50.32 (-6795)	304.11 (39.17)	2.06 (18.48)	0.94 (73.11)	50.32 (-22559)	16931.43
1198	353.62 (-0.44)	1.97 (2.83)	0.97 (51.95)	11.29 (49.31)	353.62 (-26.95)	1.97 (25.97)	0.97 (80.53)	11.29 (65.29)	353.62 (29.73)	1.97 (25.78)	0.97 (25.37)	11.29 (-1447)	353.62 (29.26)	1.97 (22.09)	0.97 (72.26)	11.29 (-4985.8)	17542.06
1199	297.35 (15.54)	2.05 (-1.38)	0.96 (52.31)	42.74 (-91.84)	297.35 (-6.75)	2.05 (22.75)	0.96 (80.67)	42.74 (-31.37)	297.35 (40.91)	2.05 (22.56)	0.96 (25.93)	42.74 (-5757)	297.35 (40.52)	2.05 (18.71)	0.96 (72.47)	42.74 (-19148)	16650.06
1120	308.92 (12.25)	2.01 (0.60)	0.98 (51.69)	30.32 (-36.06)	308.92 (-10.91)	2.01 (24.26)	0.98 (80.42)	30.32 (6.83)	308.92 (38.61)	2.01 (24.07)	0.98 (24.96)	30.32 (-4053)	308.92 (38.20)	2.01 (20.30)	0.98 (72.11)	30.32 (-13551)	16764.19

Figure 75

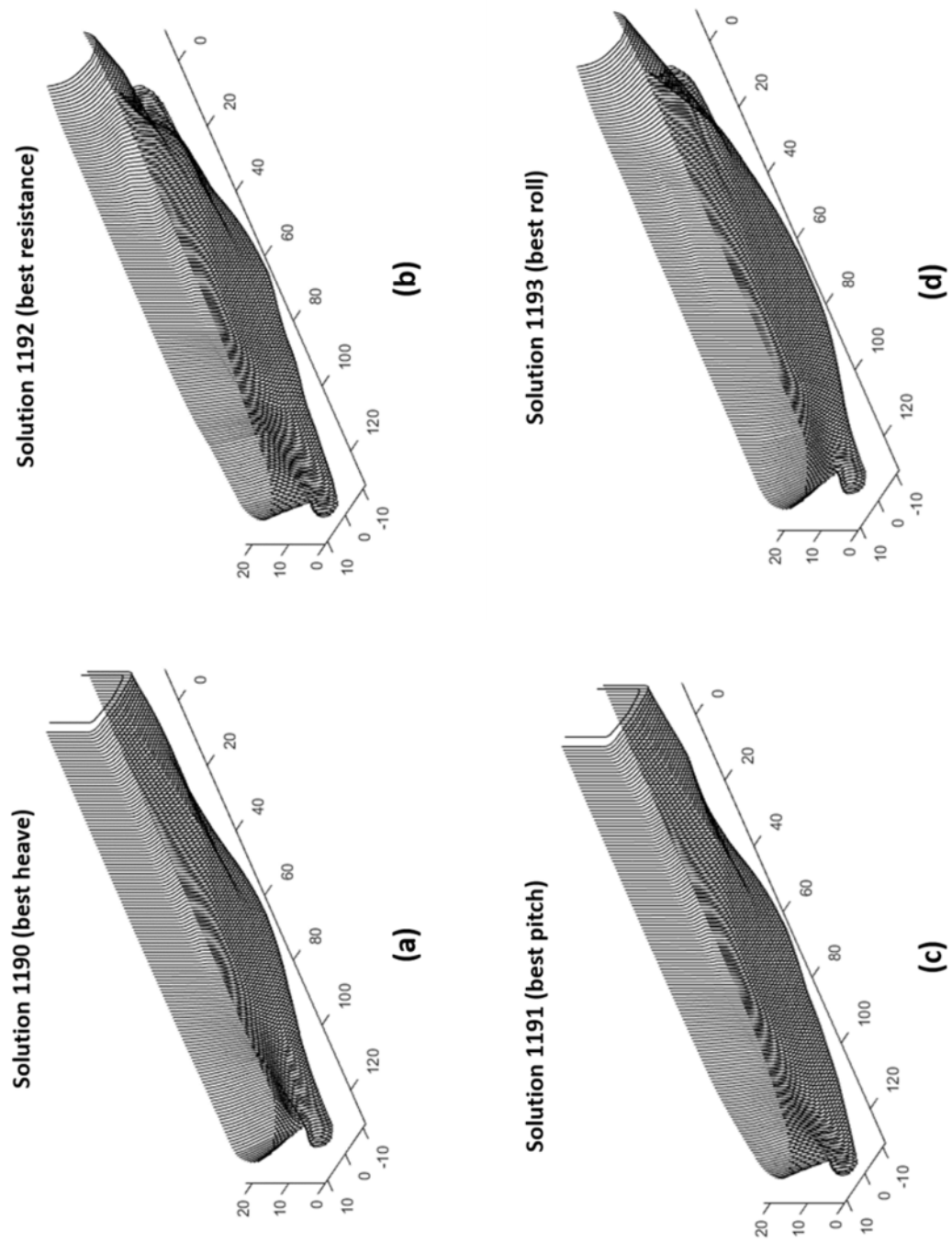


Figure 76

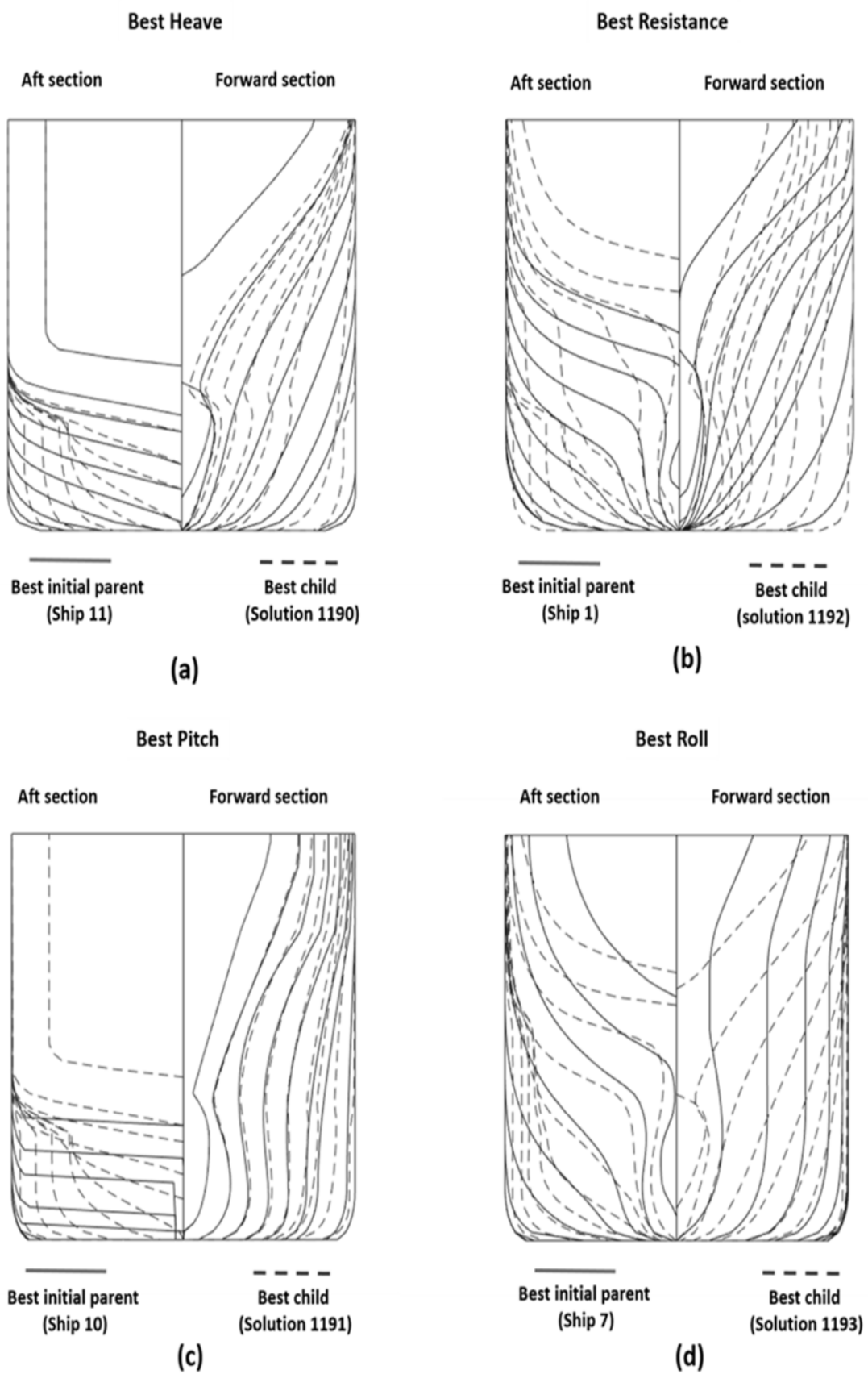


Figure 77

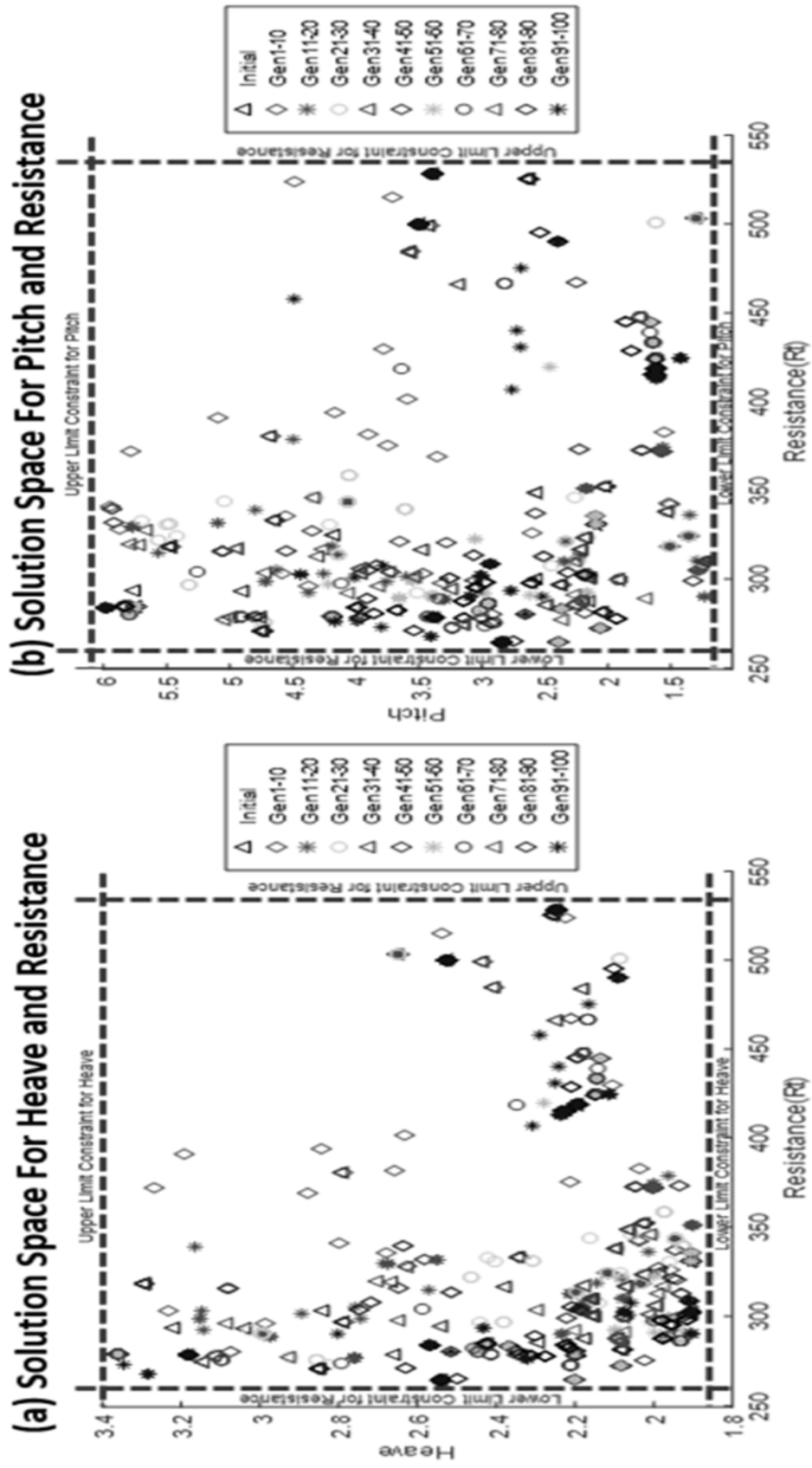


Figure 78

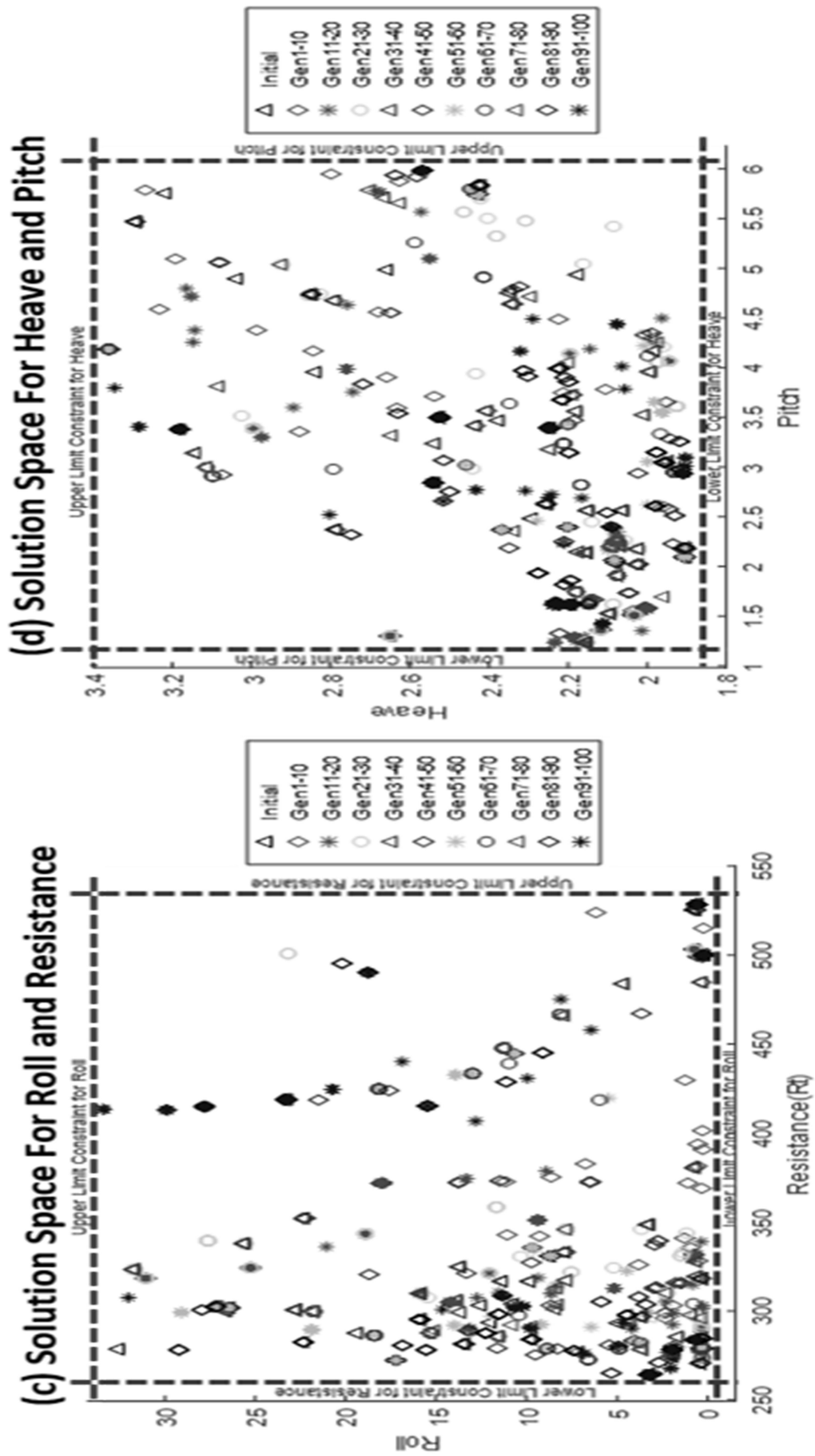


Figure 78 (Cont.)

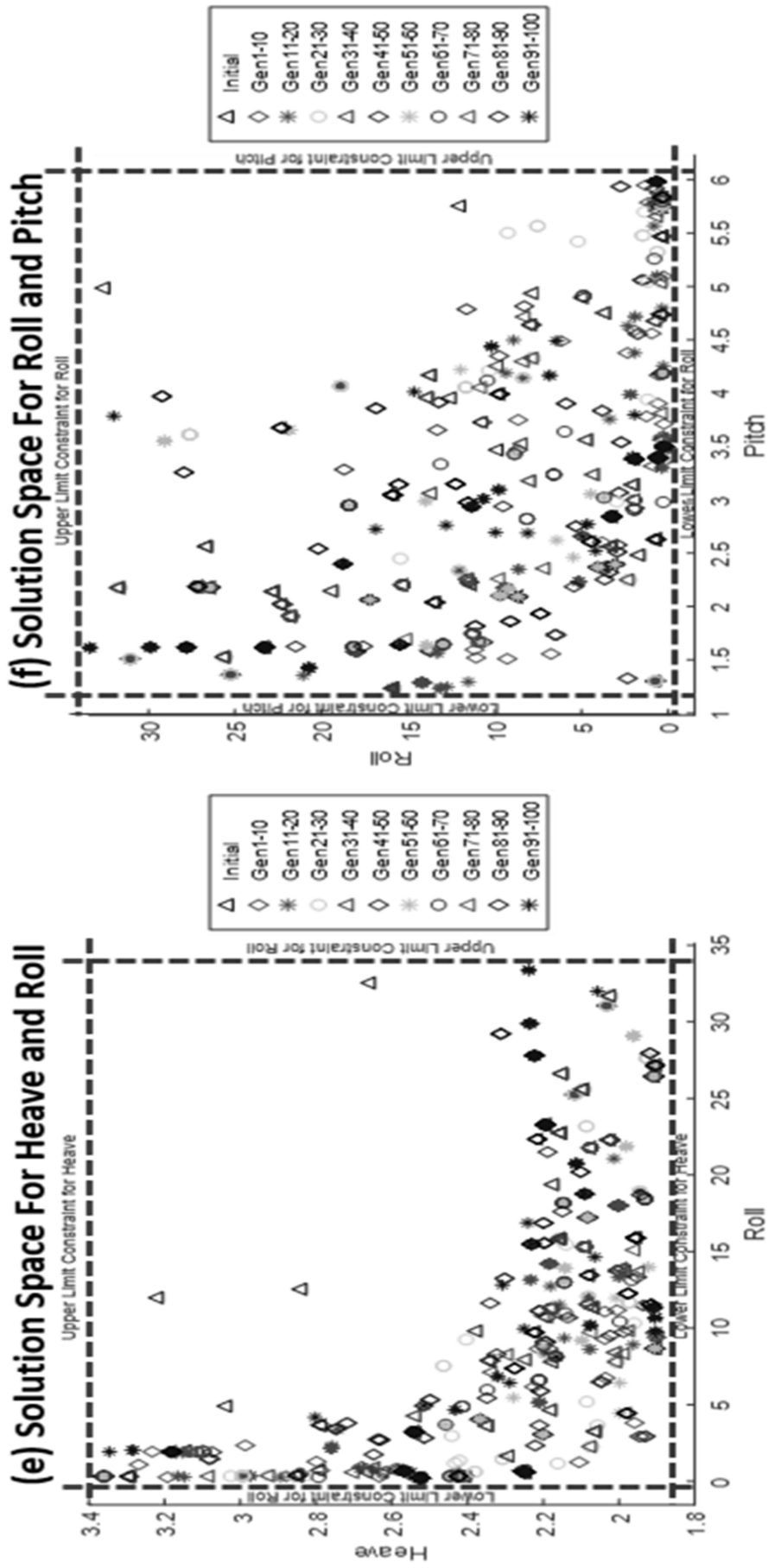


Figure 78 (Cont.)