

Contents

Introduction	7
Symbols and abbreviations	9
1 Basic information on mutual ship passage	11
1.1 Relative movement	11
1.2 Position, distance and speed triangle	14
1.3 Graphic and analytical methods of solving the position triangle	21
1.4 Graphic and analytical solutions of the distance triangle . . .	24
1.5 Graphic and analytical solution of the speed triangle	28
1.6 Target movement elements (TME)	31
1.7 Predicting the position of a maneuver object	35
1.8 Approach elements	39
1.9 Maneuver elements	47
2 Basic tactical maneuvers	49
2.1 Position taking	49
2.1.1 Shortest position taking	49
2.1.2 Position taking in a specific time frame	53
2.1.3 Position holding after a change in direction by a direc- tional ship	56
2.2 Change of distance	59
2.2.1 Change of distance, maintaining a fixed bearing	59
2.2.2 Direct approach	65
2.2.3 Change of distance in a specific time frame	67
2.2.4 Shortest change of distance	70

2.2.5	Possibilities for executing the change of distance maneuver when the speed of the object exceeds the speed of the maneuvering ship	78
2.3	Evasion	88
2.3.1	Evasion through change in course, maintaining a fixed speed	89
2.3.2	Evasion through change in speed, maintaining a fixed course	94
2.3.3	Evasion through change in course and speed	98
2.3.4	Evasion to limit distance	103
2.3.5	Determination of a dangerous course sector	107
3	Tactical reconnaissance	111
3.1	Reconnaissance in a determined direction and at a determined distance	111
3.2	Shortest reconnaissance	114
3.3	Reconnaissance in a determined direction and time	118
3.4	Reconnaissance to a determined line	120
3.5	Reconnaissance of a detected object with unknown TMEs . .	124
4	Search for objects at sea	129
4.1	Search for an immobile object	129
4.1.1	Expanding square search of an immobile object	129
4.1.2	Sector search of an immobile object	130
4.1.3	Search for an immobile object in a specific area	130
4.2	Search for an object in motion	132
4.2.1	Object search on its probable course	132
4.2.2	Object search in its probable course sector	137
4.2.3	Search of object maneuvering on a random course . . .	144
4.2.4	Frontier search	155
5	Smoke screen deployment	161
5.1	General conditions for the dispersion of smokescreens	161
5.2	Coverage of an immobile object with a smokescreen in windless and windy conditions	167
5.3	Coverage of an object in motion with a smokescreen in windless and windy conditions	172

5.4	Self-coverage of an immobile object with a smokescreen	177
5.5	Self-coverage of an object in motion with a smokescreen . . .	179
6	Selected supplementary issues	183
6.1	TME determination in extraordinary circumstances	183
6.2	Determination of formation time	186
6.3	Meeting circle and its applications	190
6.4	Isochrones and their applications	195
	Bibliography	199