

CONTENTS

Introduction	7
Section 1. MATRICES. BASIC DEFINITIONS.....	9
Exercises	22
Answers.....	24
Section 2. DETERMINANTS AND THEIR PROPERTIES.	25
Properties of determinants	29
Methods of calculation of n -th order determinants	32
Inverse matrices	34
Simplest matrix equations	37
Rank of matrix	38
Algorithm of finding the range of matrix	40
Exercises	41
Answers.....	43
Section 3. SYSTEMS OF LINEAR ALGEBRAIC EQUATIONS	44
System of linear equations.....	45
Matrix way of solving systems of linear equations	46
Cramer method	48
General theory of systems of linear equations	49
Gauss method	51
Direct course of Gauss method	51
Reverse course of Gauss method	53
Systems of linear homogeneous equations	55
Exercises	57
Answers.....	59
Section 4 VECTORS, LINEAR OPERATIONS ON VECTORS.....	60
Vector space and its basis. Coordinates of vector	60
Addition of vectors.....	61
Multiplication of vector by number.....	62
Concept of vector space and of its basis	63
Linear dependence of vectors	64
Basis of vector space.....	66
Affine and Cartesian coordinate systems.....	68
Cartesian coordinates of points.....	70
Linear operations on vectors specified by their coordinates	72
Direction cosines of vector	73
Projection of vector onto vector.....	74
Division of straight line segment in a given proportion.....	75
Multiplication of vectors	76
Properties of scalar product	77
Application of scalar product.....	78

Vector product.....	79
Properties of vector product.....	79
Application of vector product.....	80
Mixed product.....	81
Properties of mixed product.....	82
Application of mixed product.....	83
Exercises.....	87
Answers.....	91
Section 5 ANALYTIC GEOMETRY IN PLANE.....	92
Straight line in plane.....	92
Equation of straight line in plane.....	92
Polar system of coordinates in plane.....	94
Parametric equation of a line in plane.....	96
Straight line in plane.....	97
Mutual positions of straight lines. Angle between straight lines in plane.....	104
Distance from a point to a straight line.....	107
Exercises.....	108
Answers.....	110
Section 6 QUADRATIC CURVES (Second degree curves).....	111
Circle.....	112
Ellipse.....	112
Hyperbola.....	117
Parabola.....	121
Exercises.....	123
Answers.....	125
Section 7 ANALYTIC GEOMETRY IN SPACE.....	126
Plane.....	126
Normal equation of plane.....	130
Distance from a point to the plane.....	131
Angle between two planes.....	132
Exercises.....	134
Answers.....	136
Section 8 STRAIGHT LINE IN SPACE.....	137
Relative position of straight line and plane.....	137
Standart equation of a straight line in space.....	137
Parametric equation of straight line.....	138
General equation of straight line.....	139
Angle between straight lines.....	141
Relative position of straight line and plane. Angle between straight line and plane.....	142
Point of intersection of straight line and plane.....	144
Exercises.....	145
Answers.....	150
Literature.....	151
Appendix.....	152