

Index

- 2×2 determinant, 71
- algorithm, Gauss-Jordan, 8
- angle between vectors, 166
- asymptotes, 137
- basis, left-to-right algorithm, 62
- Cauchy-Schwarz inequality, 159
- centroid, 185
- column space, 56
- complex number, 89
- complex number, imaginary number, 90
- complex number, imaginary part, 89
- complex number, rationalization, 91
- complex number, real, 89
- complex number, real part, 89
- complex numbers, Apollonius' circle, 100
- complex numbers, Argand diagram, 95
- complex numbers, argument, 103
- complex numbers, complex conjugate, 96
- complex numbers, complex exponential, 107
- complex numbers, complex plane, 95
- complex numbers, cross-ratio, 114
- complex numbers, De Moivre, 107
- complex numbers, lower half plane, 95
- complex numbers, modulus, 99
- complex numbers, modulus-argument form, 103
- complex numbers, polar representation, 103
- complex numbers, ratio formulae, 100
- complex numbers, square root, 92
- complex numbers, upper half plane, 95
- coordinate axes, 154
- coordinate planes, 154
- cosine rule, 166
- determinant, 38
- determinant, cofactor, 76
- determinant, diagonal matrix, 74
- determinant, Laplace expansion, 73
- determinant, lower triangular, 74
- determinant, minor, 72
- determinant, recursive definition, 72
- determinant, scalar matrix, 74
- determinant, Surveyor's formula, 85
- determinant, upper triangular, 74
- differential equations, 120
- direction of a vector, 164
- distance, 154
- distance to a plane, 184
- dot product, 131, 156
- eigenvalue, 118
- eigenvalues, characteristic equation, 118
- eigenvector, 118

ellipse, 137
 equation, linear, 1
 equations, consistent system of, 1, 11
 equations, Cramer's rule, 39
 equations, dependent unknowns, 11
 equations, homogeneous system of, 16
 equations, homogeneous, non-trivial solution, 16
 equations, homogeneous, trivial solution, 16
 equations, inconsistent system of, 1
 equations, independent unknowns, 11
 equations, system of linear, 1

 factor theorem, 95
 field, 3
 field, additive inverse, 4
 field, multiplicative inverse, 4

 Gauss' theorem, 95

 hyperbola, 137

 imaginary axis, 95
 independence, left-to-right test, 59
 inversion, 74

 Joachimsthal, 163

 least squares, 47
 least squares, normal equations, 47
 least squares, residuals, 47
 length of a vector, 131, 157
 linear combination, 17
 linear dependence, 58
 linear equations, Cramer's rule, 84
 linear transformation, 27
 linearly independent, 41

 mathematical induction, 31
 matrices, row-equivalence of, 7
 matrix, 23
 matrix, addition, 23
 matrix, additive inverse, 24
 matrix, adjoint, 78
 matrix, augmented, 2
 matrix, coefficient, 26
 matrix, coefficient , 2
 matrix, diagonal, 49
 matrix, elementary row, 41
 matrix, elementary row operations, 7
 matrix, equality, 23
 matrix, Gram, 132
 matrix, identity, 31
 matrix, inverse, 36
 matrix, invertible, 36
 matrix, Markov, 53
 matrix, non-singular, 36
 matrix, non-singular diagonal, 49
 matrix, orthogonal , 130
 matrix, power, 31
 matrix, product, 25
 matrix, proper orthogonal, 130
 matrix, reduced row-echelon form, 6
 matrix, row-echelon form, 6
 matrix, scalar multiple, 24
 matrix, singular, 36
 matrix, skew-symmetric, 46
 matrix, subtraction, 24
 matrix, symmetric, 46
 matrix, transpose, 45
 matrix, unit vectors, 28
 matrix, zero, 24
 modular addition, 4
 modular multiplication, 4

 normal form, 180

 orthogonal matrix, 116
 orthogonal vectors, 168

 parabola, 137
 parallel lines, 164

parallelogram law, 150
perpendicular vectors, 168
plane, 176
plane through 3 points, 176, 178
position vector, 156
positive octant, 154
projection on a line, 171

rank, 66
real axis, 95
recurrence relations, 32
reflection equations, 29
rotation equations, 28
row space, 56

scalar multiplication of vectors, 150
scalar triple product, 173
skew lines, 172
subspace, 55
subspace, basis, 61
subspace, dimension, 63
subspace, generated, 56
subspace, null space, 55

Three-dimensional space, 154
triangle inequality, 160

unit vectors, 158

vector cross-product, 172
vector equality, 149, 165
vector, column, 27
vector, of constants, 26
vector, of unknowns, 26
vectors, parallel vectors, 164