

# Index

## A

Algebraic curve, 3  
Amplitude function, 97  
Antisymmetric matrix, 23  
Artificial membrane, 70

## B

Bilayer lipid membranes, 80  
Binormal, 16  
Black bilayer, 71

## C

Cassini ovals, 62  
Cauchy–Riemann condition, 166  
Christoffel symbols, 30  
Codazzi–Mainardi–Peterson equations, 32  
Coefficients of the first fundamental form, 26  
Coefficients of the second fundamental form, 28  
Co-lemniscate, 50  
Co-moving frame, 48  
Complementary elliptic modulus, 173  
Contact plane, 14  
Covariant derivative, 158  
Curvature, 3  
Curvature radius, 4  
Curvature vector, 5  
Curvilinear coordinates, 25

## D

Determining system of equations, 165

## E

Elliptic modulus, 49  
Enzymes, 75  
Essential equations, 24  
Euler’s elastica equation, 114

## F

First fundamental form, 26  
Fluid mosaic model, 76  
Free elastica equation, 114  
Frenet–Serret formulas, 22

## G

Gauss–Codazzi–Minardi equations, 32  
Gauss curvature, 29  
Gauss map, 92, 185  
Generalised elastica equation, 188  
Glycocalyx, 72

## I

Infinitesimal operator, 165  
Inflection point, 10  
Integral membrane proteins, 75  
Intrinsic equation of the curve, 6  
Intrinsic equations, 24  
Invariants of  $\wp$ , 211

## J

Jacobian elliptic functions, 97

## K

Kronecker symbol, 158

**L**

Laplace-Beltrami operator, 160  
Laplace-Young equation, 84  
Lie equations, 164  
Lie group generator, 165  
Lipids, 73  
Logarithmic spiral, 58

**M**

Mean curvature, 29  
Membrane, 69  
Model membrane, 71  
Monge parameterization, 43  
Moving frame, 16

**N**

Native membranes, 70  
Natural equations, 24  
Natural membrane, 70  
Natural parameter, 3  
Nodary, 97  
Normal curvature, 33  
Normal plane, 8  
Normal vector, 26

**O**

Orthogonal matrix, 23  
Oscillating amplitude, 175  
Osculating plane, 14

**P**

Peripheral membrane proteins, 75  
Plasma membrane, 70  
Principal curvatures, 33

Principal normal line, 13  
Principal unit normal vector, 13

**R**

Receptors, 75  
Reconstructed membrane, 70  
Rectifying, 16  
Regular point, 26

**S**

Second curvature, 18  
Second fundamental form, 28  
Serret's curves, 59  
Spontaneous curvature, 153  
Structural proteins, 75

**T**

Tangent, 8  
Torsion, 18  
Transcendental curve, 3  
Transport proteins, 75

**U**

Undulatory, 97  
Unit binormal vector, 16  
Unit tangent vector, 7

**V**

Vector field, 165

**W**

Weingarten equations, 31