A	Dupin, 35, 100
Associative rule, 2	elliptical cylinder, 30, 162
В	general curvilinear system
Bilinear transformation, 32	(GCS), 23
Bivector,135	oblate spherical, 31, 163
Bladel, J. Van, 99, 105	orthogonal curvilinear system
Borisenko, A. J., 17, 148,155	(OCS), 28
Brand, L., 17, 105	parabolic cylinder, 30, 162
Burali-Forti, C., 130	prolate spheroidal, 30, 163
C	spherical, 30, 161
Candel, S. M., 119	Cross-∀-cross theorem, 110
Clifford, W. K., 132	Cross-gradient theorem, 110
Closed surface theorem, 27, 92	Cross product or vector product, 5,
integral form of, 93	131
Cofactors, 11	Crowe, M. J., 127
Conformal transformation, 33	Curl
Convergence, 132	alternative definition of, 77
Coordinate system	of a dyadic function, 121
bipolar cylinders, 31, 164	in Cartesian system, 65, 132
Cartesian or rectangular, 3	in general curvilinear system, 71
cylindrical, 30, 161	Gibbs's notation for, 65, 135

Curl (cont.)	Dyadic Green function, 98
linguistic notation of, 128	Dyadic identities, 124, 166
in orthogonal curvilinear system,	Dyadic integral theorems, 124
64	E
Curl theorem, 92	Einstein, A., 174
surface, 109	notation, 10
Curvature	F
Gaussian, 39	Fang, N. H., 58, 151
radius of, 37	Feshback, H., 154
surface, 41	Feynman, R. P., 148
D	Flux, 75
Del operator, 62	Four-vector, 15, 178
Derivatives of unit vectors, 33	
Differential-algebraic operators,	G Gans, R., 149
102, 103	
Differential area, 43	Gauge condition, 98
Differential length, 43	Gauss, theorem or divergence
Differential volume, 44	theorem, 92
Directional cosines, 3, 10	generalized, 91
Directional radiance, 75	generalized surface, 106
Distributive law	Gibbs, J. W., 15, 24, 63, 129, 135
for scalar products, 5	Gradient
for vector products, 6	alternative definition of, 75
Divergence	in Cartesian system, 65
of a dyadic function, 123	in general curvilinear system, 70
in Cartesian system, 65	method of, 78
in general curvilinear system, 71	in orthogonal curvilinear system
Gibbs's notation for, 63, 134	62
linguistic notation of, 128	of a vector, 87, 122
in orthogonal curvilinear system,	Gradient theorem, 92
62	surface, 109
Divergence theorem, 92	Green's theorem
surface, 109	first dyadic-dyadic, 126
Dot product, 4	first scalar, 94
Dyadic algebra, 16	first vector, 95
Dyadic function, 16	first vector-dyadic, 125
antisymmetric, 17	scale-vector, 168
Cartesian, 16	second dyadic-dyadic, 126
classification of, 17	second dyadic-dyadic, 120
scalar product of, 19	second vector, 95
symmetric, 17	
transpose of, 19	second vector-dyadic, 125
vector product of, 21	surface, 114

Н	Maxwell's theorem, 119
Hallén's formula, 92	Metric coefficients, 28
Hamilton, W. R., 129	Milne, E. A., 156
Haus, H., 124	Moon, P., 127, 130, 152
Heaviside, O., 129, 141, 149	Morse, P. M., 154
Helmholtz, H. L. F. von, 116	N
Helmholtz theorem, 97	Nomenclature and notations,
transport theorem, 116	181
Helmholtz wave equation	0
scalar, 98	Operand, 132
vector, 98	Operator(s), 132
1	binary, 132
Idemfactor, 19, 25, 122	cascade, 132
Integral theorems, 167	cross, 133
relationship between, 170	curl, 58, 64, 140
J	del, 62, 127
Jackson, J. D., 130	differential-algebraic surface,
Jacobian	102, 103
scalar, 49	divergence, 58, 63, 140
vector, 49	dot, 133
K	gradient, 58, 62, 139
Kronecker δ function, 12	Hamilton, 62
L	invariance of, 65
Lagally, M., 147	nabla, 62
Laplace, P. S., 87	unary, 132
Laplacian	P
of a scalar, 86	Panofsky, W. K. H., 155
surface, 114	Penfield, P., 124
of a vector, 87, 153	Phillips, H. B., 97
Leighton, R. B., 148	Phillips, M., 155
Lemma 4.1, 60	Poinsot, T. J., 119
Lemma 4.2, 82	Poisson's equation
Lemma 5.1, 112	scalar, 96
Line integrals, classification of, 44	vector, 97
Linguistic notation, 105, 128	Position vector, 23
Lorentz, H. A., 119	Potential function
transform, 174	dynamic scalar, 97
M	dynamic vector, 97
Marcolongo, R., 130	electrostatic, 96
Mason, M., 147	magnetostatic vector, 97
Material derivative, 119	Q
Maxwell's equations, 96, 175	Quarternion, 129, 131

R	Triple product
Radiance, 75	of dyadics, 21
Reynolds transport theorem, 120	of vectors, 6
Rotation of Cartesian coordinate	Truesdell, C., 119
system, 8	Twisted differential operator, 146
S	Twisted vector function, 146
S-vector, 59	Typesetting of S-vector, divergence
typesetting of, 183, 184	and curl operator, 183, 184
Sands, M., 148	U
Scalar product, 4	Unit vectors, 3
Schelkunoff, S. A., 147	derivatives of, 33
Shear, 75	transformation of, 79, 161
Shilov, G. E., 151	V
Six-vector, 15, 179	Vector or vector function, 1
Sommerfeld, A., 177	axial, 15
Special theory of relativity, 174	components of, 3
Spencer, D. E., 127, 130, 152	controvariant components of, 25
Stokes, G. G., 110	covariant components of, 25
Stokes theorem, 110	irrotational, 95
Stratton, J. A., 73, 130, 153	orthogonal transformation of, 8
Surface curl, 103	polar, 14
theorem, 109	position, 23
of Weatherburn, 105	primary, 23
Surface gradient, 101	reciprocal, 24
theorem, 109	reciprocal unitary, 24
of Weatherburn, 105	screw, 15
Surface integrals, classification of,	solenoidal, 95
48	unitary, 24
Surface symbolic expression, 100	Vector identities, 82, 165
with two functions, 110	Vector Laplacian, 153
with two surface S-vectors, 113	Vector product, 5
Surface symbolic vector, 99	formal (FVP), 143
partial, 111	Volume integrals, classification of,
T	56
Tai, C. T., 21, 58, 63, 119, 127, 146	W
Tarapov, I. E., 17, 148, 155	Weatherburn, C. E., 99, 104
Tensor, 17, 179	Weaver, W., 147
Toupin, R., 119	Weber, E., 151
Transform of field vectors, 176	Wilson, E. B., 129, 141, 160