Contents

1	Ma	tnematical Foundations	1		
1	Col	lections and Relationships	2		
	1.1	What is Algebra?	2		
	1.2	Sets	5		
	1.3	Sequences	8		
	1.4	Functions	9		
	1.5	Mappings	11		
	1.6	Groups	12		
	1.7	Arrays	15		
2	A Primer on Linear Algebra 2				
	2.1	Structuring by Field	26		
	2.2	Structuring by Metrics	26		
	2.3	Linear Functions	26		
	2.4	Matrix Representations	26		
	2.5	Eigenvalues and Eigenvectors	26		
3	Tensor Algebra 28				
	3.1	Historical Summary	28		
	3.2	Tensor Spaces	28		
	3.3	Tensor Functions	28		
	3.4	Isotropy and Anti-Isotropy	28		
	3.5	Tensor Fields	28		

Contents

4	Topics of Affine Geometry				
	4.1	Affine Spaces	30		
	4.2	Affinities	30		
	4.3	Metric Affine Spaces	30		
5	Calculus of Tensor Functions				
	5.1	Differentiation	32		
	5.2	Measure and Integration	32		
II	Elei	mentary Continuum Mechanics	33		
6	Con	tinuous Media	36		
	6.1	Continuum Hypothesis	36		
	6.2	Mechanics	36		
7	Kinematics of Continua				
	7.1	Newtonian Space-Time	38		
	7.2	Deformation	38		
	7.3	Motion	38		
	7.4	Lagrangian and Eulerian Descriptions	38		
8	Dynamics of Continua				
	8.1	Mass and Momenta	40		
	8.2	Forces	40		
	8.3	Cauchy Stress	40		
	8.4	Energies	40		
9	Constitutive Relations				
	9.1	General Principles	42		
	9.2	Elasticity Basics	42		
Bi	bliog	raphy	44		
Notation and Symbols					
Index					