

<b>Contents</b>	
About the Author.....	5
Denotations.....	7
1 Introduction.....	8
2 Hyperelastic Murnaghan material.....	9
2.1 Constitutive relationship.....	9
2.2 Derivatives of elastic energy.....	9
2.3 Elasticity constants for selected materials.....	10
3 Fundamentals of non-linear theory of elasticity.....	11
3.1 Introduction.....	11
3.2 Basic equation of motion of material continuum.....	11
3.3 Determination of the surfaces of discontinuity.....	13
4 Wave of strong discontinuity – shock wave.....	16
4.1 Introduction.....	16
4.2 Theoretical basis and wave amplitude.....	17
4.3 Condition of propagation of the shock wave.....	18
4.4 Velocity of propagation of the wave of strong discontinuity.....	21
5 Change in the amplitude for the wave of strong discontinuity propagating in the thin rod	24
5.1 Basic relationships.....	24
5.2 Equation of the shock wave amplitude.....	26
5.3 Numerical analysis for the rod with increasing cross-section.....	27
5.4 Shock wave in the rod with decreasing cross-section.....	30
5.5 Numerical analysis for the rod with decreasing cross-section.....	31
5.6 Summary and final conclusions.....	31
6 Change in the amplitude for the wave of strong discontinuity propagating in the thin shield	32
6.1 Basic relationships.....	32
6.2 Symmetrical motion of a thin shield.....	34
6.3 Averaging procedure of the equations of motion.....	35
6.4 Conditions of consistency and velocity of propagation of shock waves.....	36
6.5 Indication of acceptable solutions.....	39
7 Reflection of the longitudinal wave of strong discontinuity that propagates in a spatial material continuum.....	40
7.1 Introduction.....	40

7.2	Basic relationships	40
7.3	Simply waves in a spatial state of strain	44
7.4	Discussion of the reflection of plane waves in Murnaghan material	46
7.5	Reflected simply waves in a plane state of strain	47
7.6	Numerical analysis	50
	Summary	53
	References	54
	Appendix	58
	Numerical modelling of wave phenomena using ADINA software	58
	Abstract	59