

Introduction.....	4
1 Computational Modeling of Planar Solid Body Systems.....	7
1.1 Numerical Methods in Continuum Mechanics.....	9
2 Introduction to the Finite Element Method (FEM).....	11
2.1 Linear Analysis of Static Tasks.....	13
2.2 Modeling with Four-node Tetrahedral Space Elements.....	17
3 Kinematic Analysis of Planar Solid Body Systems.....	21
3.1 Basic Concepts and Fundamental Terms.....	21
3.2 Classification of Solid Body Systems (Mechanisms).....	22
3.3 Formation of Planar Mechanisms.....	23
3.4 Degree of Freedom of Body System.....	29
3.5 Formation of Kinematic equations.....	30
4 Matrix expression of Kinematic Variables.....	33
4.1 Matrix Expression of Kinematic Variables at Rotary Motion.....	33
4.2 Matrix Expression of Kinematic Variables at General Planar Motion.....	34
4.3 Matrix expression of Kinematic Variables at Simultaneous Motions.....	35
5 Vector Method.....	38
5.1 Kinematic Analysis for Four-Item Mechanism.....	40
5.2 Kinematic Analysis for Six-Item Mechanism.....	43
5.3 Kinematic Analysis for Seven-Item Mechanism.....	48
5.4 Kinematic Analysis for Ten-Item Mechanism.....	53
5.5 Kinematic Analysis of the Pressing Machine.....	62
5.6 Kinematic Analysis of the manipulator for removal of rough tyres.....	67
6 Dynamic Analysis for Solid Body Systems with Rigid Items.....	72
6.1 Dynamic Relaxation Method.....	72
6.2 Dynamic Analysis for Six-Item Mechanism.....	73
6.3 Dynamic Analysis of the Pressing Machine.....	76
7 Dynamic Analysis for Solid Systems with Elastic Items.....	80
7.1 Flexibility of Mechanical System.....	84
7.2 Dynamic Analysis for Four-Item Mechanism.....	86

7.3	Dynamic Analysis of Lever Mechanism for Manufacturing of Raw Tyres ..	94
7.3.1	Dynamic Analysis of Normal Force for Lever Mechanism	95
8	Kinematic and Dynamic Analysis and Distribution of Stress for Planar Mechanisms by Means of SolidWorks Software	101
8.1	Kinematic and Dynamic Analysis and Distribution of Stress for Four-Item Mechanism.....	101
8.1.1	Type of finite elements and material properties	105
8.1.2	Distribution of the Stress in Items of Planar Mechanism.....	106
8.2	Kinematic Analysis and Distribution of Stress for Five-Item Mechanism .	109
8.2.1	Type of finite elements and material properties	113
8.2.2	Distribution of the Stress in Items of Planar Mechanism.....	114
8.3	Kinematic and Dynamic Analysis and Distribution of Stress for Six-Item Mechanisms	117
8.3.1	Type of finite elements and material properties	121
8.3.2	Distribution of the Stress in Items of Planar Mechanism.....	122
9	Procedures for Kinematic and Dynamic Analysis of Planar Mechanisms by Means of SolidWorks Software.....	144
	Literature	153