



﴿أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَسَالَتْ أَوْدِيَهُ بِقَدَرِهَا
فَاخْتَمَلَ السَّبِيلُ زَبَدًا رَابِيًا وَمِمَّا يُوقِدُونَ عَلَيْهِ فِي
النَّارِ ابْتِغَاءَ حُلْيَةٍ أَوْ مَتَاعٍ زَبَدٌ مِثْلَهُ كَذَلِكَ يَضْرِبُ
اللَّهُ الْحَقَّ وَالْبَاطِلَ فَأَمَّا الزَّبَدُ فَيَذْهَبُ جُفَاءً وَأَمَّا
مَا يَنْفَعُ النَّاسَ فَيَمْكُثُ فِي الْأَرْضِ كَذَلِكَ يَضْرِبُ
اللَّهُ الْأَمْثَالَ﴾

صدق الله العظيم

سورة الرعد

الآية 17

Dedication

To
My . . . Mother
My . . . Father
My . . . Family
&
My Friends
To my Dear Um-Rashid

إلى . . .
أمي وأبي العزيزين
إلى . . .
أسرتي الكريمة
وإلى . . .
أصدقائي
إلى . . .
عزيزتي أم راشد

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All thanks to my parents who give me
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Also my thanks to my friends for their
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ABSTRACT

Active suspension control systems are used into cars body because of their ability to manage the compromise between ride comfort and vehicle road-handling. They constitute typical example of distributed control system. In this study the ride controller part of an active suspension system is presented and evaluated, taking into account its distributed architecture.

The simulations are realized with the MATLAB/SIMULINK tool box true time, which allows the simulation of the controlled system, integrating simple models of its implementation (taskexection, processor scheduling, net work transmission.....).

It has been shown that the study of active suspension system through a simulation method, is the best way to handle the road..

مستخلص البحث

تستخدم أنظمة تحكم التعليق الفعال في هياكل السيارات وذلك نسبة لقدرتها على إيجاد حل وسط بين رفاة الركوب ومعالجة العربة للطريق. تشكل هذه الأنظمة الحل المثالي لنظام التحكم الموزع.

في هذه الدراسة تم تقديم وتقييم حاكم الركوب كجزء من نظام التعليق الفعال، وأخذ في الاعتبار توزيعه الهندسي من خلال المحاكاة وبأدوات الماتلاب/سيمولينك ذات الزمن الحقيقي، والذي يسمح بمحاكاة نظام التحكم، ويكامل بين النماذج البسيطة وتنفيذها (تطبيق المهمة، جدول المعالجة، ونقل عمل الشبكة.....).

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Contents

Content	Page
الاية	I
Dedication	II
Acknowledgements	III
Abstract English	IV
Abstract Arabic	V

Contents	VI
List of Tables	IX
List of Figures	X
Nomenclature	XIII
Chapter One	
Introduction	
1-1 General Introduction	1
1-2 Objective of the project	3
1-3 The Statement Of The Problems	4
1-4 Methodology	4
Chapter Two	
Active Suspension Design	
2-1 Design Process Of Suspension Systems	5
2-2 Driving Safety	6
2-3 Driving Comfort	6
2-4 springs	6
2-5 Shock Absorbers	7
2-6 Types of Suspension Systems	8
2-6-1 Front Suspension - Dependent System	9
2-6-2 Front suspension - independent systems	10
2-6-3 Suspension Types: Rear: Dependent Rear Suspension	10
2-6-4 Independent Rear Suspensions	11
2-6-5 Double Wishbone Suspension Systems	14
2-7 Passive Suspension	20
2-8 Semi-Active Suspension	21
2-9 Self-Leveling Systems	22
2-10 Active Suspension	22
2-11 Pre-Processing Design Stage	24
2-12 Kinematic Modeling Of Suspension Systems	24
2-13 Active Suspension Systems	26
2-14 Effects of Vibration on the Human Body	29
2-15 Road Roughness Model	31
2-16 Genetic Algorithm	32
Chapter Three	
suspension Accent GIAD2009	
3-1 Improved Ride and Handling	36

3-2 Front Suspension	37
3 -2 -1 Repositioned Lower Arm	37
3-2-2 Enlarged Bush of Sub-Frame	37
3-2-3 Shock Absorber-United insulator	37
3-3 Rear Suspension	38
3-4 Bevel	44
3-4-1 Important Note	44
3-5 Active Geometry Controlled Suspension	45
3-6 Electronic Controlled Suspension (ECS)	46
3-7 ECS-III System	47
Chapter Four	
Mathematical Modeling	
4-1 Mathematical Modeling	50
4-2 Passive Suspension System	50
4-3 Active Suspension System	52
4-4 PID Controller Design	53
4-5 Objective Function	56
4-6 Controller Gain	57
4-7 Frequency Domain Analysis	58
4-8 Time Domain Analysis	59
4-9 Classification of Road Surfaces	59
4-10 Sinusoidal Approximation	60
4-11 Design Passive Suspension System By Using Block Diagrams	63
4-12 Design of Active suspension system by using block diagrams	65
Chapter Five	
Results & Discussion	
5-1 Results of the Suspension System	69
5-2 Discussion	79
Chapter Six	
Conclusion & Recommendations	
6-1 Conclusion	81
6-2 Recommendations	82
References	83

List of Tables

	Page
Table (2-1) : Resonance frequencies of the human body	30
Table (2-2): Road roughness values classified by ISO	31
Table (3-1): FR Spring & Shock Absorber	38
Table (3-2): FR Spring & Shock Absorber	39
Table (3-3): FR Spring & Shock Absorber	40
Table (3-4): Types Suspensions of GIAD	41
(Table (3-5): Permissible Axle Weight (kg	41
Table (3-6):Gross Vehicle Weigh	41
Table (3-7): Dimension	43
Table (3-8): Influence of toe on driving stability	48

List of Figures

Figure Name	Page
Figure 2-1 Design stages of suspension systems	5
Figure 2-2 Twin – tube shock absorber	8
Figure 2-3. Macpherson Strut See	11
Figure 2-4. Macpherson Strut or McPherson strut	12
Figure 2-5 Rover 2000 Macpherson derivative	13
Figure 2-6 Coil Spring type 1	15
Figure 2-7 Coil Spring type2	15
Figure2-8 Multi-link suspension	16
Figure 2-9 Trailing-arm suspension	17
Figure 2-10 Twin I-Beam suspension	17
Figure 2-11 Moulton rubber suspension	18
Figure 2-12 Transverse leaf-spring	19
Figure2-13 Normalized second-order logarithmic frequency response characteristics	21
Figure 2-14 Normalized second-order logarithmic frequency response of an optimal active vibration isolator	23
Figure 2-15 McPherson strut suspension	24
Figure 2-16 Idealized model of McPherson Strut Suspension	25
Figure 2-17 Kinematic modeling of McPherson strut suspension	26
Figure 2-18 Genetic algorithm process flow chart	33
Figure 2-19 Depiction of roulette wheel selection	34
Figure 3-1 Comparison of Ride Quality and Directional Stability	36
Figure 3-2 suspension of Accent GIAD 2009	36
Figure 3-3 Front Suspension	37
Figure 3-4 Rear Suspension	38
Figure 3-5 FR Spring & Shock Absorber	39
Figure 3-6 FR Spring & Shock Absorber	40
Figure 3-7 Dimension Vehicle	42
Figure 3-8 Dimension Vehicle	44
Figure 3-9 Active Geometry Controlled Suspension	45
Figure 3-10 Sky Hook Control	46
Figure 3-11 ECS-III system	48

Figure Name	Page
Figure 4-1 Quarter car model of passive suspension	50
Figure 4-2 Quarter car model of active suspension	53
Figure 4-3 PID controller	54
Figure 4-4 Block diagram of closed loop system	55
Figure 4-5 Settling time variation (sec)	57
Figure 4-6 Acceleration variation (m/s^2)	58
Figure 4-7 Sinusoidal approximation	60
Figure 4-8 Sine wave 66	61
Figure 4-9 Subsystem of the passive suspension	63
Figure 4-10 Subsystem of the active Suspension	65
Figure 4-11 Comparative of design active and passive suspension system By using block diagram	68
Fig (5-1) Deflection car body passive	69
Fig (5-2) Deflection wheel passive	70
Fig (5-3) Velocity body passive	70
Fig (5-4) Velocity wheel passive	71
Fig (5-5) Actuated force.	71
Fig (5-6) Deflection car body active	72
Fig (5-7) Deflection wheel active	72
Fig (5-8) Velocity body active	73
Fig (5-9) Velocity wheel active	73
Fig (5-10) Velocity body active	74
Fig (5-11) deflection of passive & active wheel	74
Fig (5-12) Velocity for passive & active wheel	75
Fig (5-13) Velocity for passive & active body	75
Fig (5-14) Velocity of wheel passive without damping ($c=0$)	76
Fig (5-15) Deflection of wheel passive without damping ($c=0$)	76
Fig (5-16) Velocity of body active without damping ($c=0$)	77
Fig (5-17) Velocity of wheel active without damping ($c=0$)	77
Fig (5-18) Deflection of wheel active ($c = 0$)	78

Nomenclature

m_1	: Quarter car sprung body mass , kG
m_2	: Unsprung mass , kG
k_1	: Spring stiffness , kN/m
k_2	: Tire stiffness , kN/m
c_1	: damping coefficient
x_1	: Sprung mass vertical displacement, m
x_2	: Unsparing mass vertical displacement ,m
w	: Sinusoidal road surface profile.,m
S	: static deflection of the tire spring, m,
ω	: is the frequency of the road
ω_{n1}	: fundamental natural frequency, Hz
ω_{n2}	: second natural frequency, Hz
T	: time, sec
X_1, X_2 : are the amplitudes of the sprung and unsparing mass, respectively.	
K_p	: proportional gain,
K_d	: derivative gain
A_i	: amplitude of ith sine wave, m
F	: actuator force, kN
K_i	: integral gain
ω	: waviness of road
s	: Laplace operator
ψ_i	: uniformly distributed phase angles in the
range between 0 and 2π	
Ω_i	: wave number