



DESIGN AND ANALYSIS OF FOUR-BAR MECHANISM IN ADAMS VIEW

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Abstract: The aim of this article is to design and analysis of functional four-bar mechanism in Adams View software. A four-bar mechanism is type of mechanical linkage that consists of four rigid bars (or links) connected together by joints. These mechanisms are commonly used in engineering and design to transmit motion or force from one point to another. The four bars are typically connected by a combination of revolute (rotational) and/or prismatic (linear) joints. The simplest closed chain movable linkage is a four-bar linkage, commonly known as a four-bar mechanism. It comprises four bodies called bars or links joined in a loop by four joints. The joints are typically constructed, so the links travel in parallel planes, and the assembly is known as a planar four-bar linkage. The configuration and arrangement of these joints determine the type of motion and mechanical advantage the mechanism can achieve. The present study four bar mechanism involved determination of position, velocity and acceleration characteristics of crank, coupler and output link using ADAMS VIEW software. The obtained result from the software are presented in graph which represent the mechanism behavior and its working aspects. The design and analysis of a four-bar mechanism using Adams software has proven to be a valuable and insightful endeavor. Adams was instrumental in conducting Kinematic simulations and analysis of the four-bar mechanism. Adams powerful simulation capabilities allowed for the investigation of the four Bar Mechanism behavior under different Position, Velocity, and Acceleration conditions. This Adams view was crucial in optimizing the design for desired performance characteristics and ensuring the four Bar mechanism reliability in real-world applications. By using Adams view the graphs obtained are accurate due to this we can save our valuable time in the overall process. The Kinematic simulation of Adams view collectively provided a comprehensive solution for achieving a robust and well performing four Bar Mechanism.

Index Terms – Four-Bar Mechanism, Adams software, Kinematics analysis, Simulation.

I. INTRODUCTION

A mechanism is in most general term explained as a system that transforms motion and forces from one direction to another. The mechanism can also be determined as a system that is combination of rigid bodies that are brought together with kinematic pairs. Mechanisms are brought together to establish bigger device. Consequently, mechanisms can be used in a great variety machines and devices. The simplest mechanisms are the four-bar mechanisms that is also known as four-bar linkage that possess three moving links (crank, coupler and output link), one fixed link (ground link) and four revolute joints. The functionality of a joint relies upon the relative motion allowed between the connected components. This implies the existence of a clearance between the mating parts. Various methods including finite element method, lump mass method, substructure method and continuum mechanics method have been discussed by various researchers. In this paper, the analysis of a four-bar mechanism is undertaken. In the analysis and design of mechanisms, kinematic quantities such as velocities and accelerations are of great engineering importance. Velocities and displacements give an insight into the functional behavior of the mechanism. The accelerations, on the other hand, are related to forces. The main theme of this project are the analysis of velocity and acceleration and simulation of four-bar mechanisms. Modelling of planar four-bar mechanisms will be done by using the ADAMS software. By this software we can simulate their link at different positions and find the velocity and acceleration graph and compared with analytical equations. ADAMS is more reliable software because it considers masses, center of mass location and inertia properties on the links. A four-bar mechanism is type of mechanical linkage that consists of four rigid bars (or links) connected together by joints. These mechanisms are commonly used in engineering and design to transmit motion or force from one point to another. The four bars are typically connected by a combination of revolute (rotational) and/or prismatic (linear) joints. The simplest closed-chain movable linkage is a four-bar linkage, commonly known as a four-bar mechanism. It comprises four bodies called bars or links joined in a loop by four joints. The joints are typically constructed, so the links travel in parallel planes, and the assembly is known as a planar four-bar linkage. The configuration and arrangement of these joints determine the type of motion and mechanical advantage the mechanism can achieve. A link that is fixed in place relative to the viewer is called a ground link. A link connecting to the ground by a revolute joint that can perform a complete revolution is called a crank link. The main theme of this project are the analysis of velocity and acceleration and simulation of four-bar mechanisms. Modelling of planar four-bar mechanisms will be done by using the ADAMS software. By this software we can simulate their link at different positions and find the velocity and acceleration graph and compared with analytical equations. ADAMS is more reliable software because it considers masses, center of mass location and inertia properties on the links.

II. LITERATURE REVIEW

Darina Hroncová, Michal Binda, Patrik Šargaa, František Kiák (2012) [1] the authors have carried out to develop a functional model of centric crank mechanism in ADAMS/View software, and its following complete kinematical analysis. They deal directly with modeling the crank mechanism in ADAMS/View software. The next stage is the simulation with a set of different parameters to obtain its kinematical analysis. Finally the graphs and data gathered in this process is compared and evaluated. This is beneficial in terms of convenience, simplicity and low cost compared to other mechanisms that mainly need adjustment to the angular speed of the input cranks that is complicated and expensive. In addition, this new mechanism provides adjustment for three planting distances (200 mm, 250 mm, 300 mm). Kinematics were analyzed to determine the speed of the planting duckbill, the crane, the anchor points of link 5, planting distances and the zero-speed of the planting duckbills. The results showed that transplanting with the six-bar mechanism installed in the crane produced the planting distances as required and the plants had vertically straight stems and were healthy and well grown.

Alžbeta Sapietová, Vladimír Dekýša (2016) [2] the authors have carried out the a dynamical analysis of misalignment of rotating machines in programme for dynamic of systems of bodies MSC ADAMS. There are two basic types of misalignment analysed, parallel and angular. In shaft support of virtual models of each type of misalignment, there are parameters as deflection, velocity and acceleration analysed. Symptoms of failure states will be presented in frequency spectrums processed by Fourier transformation.

N. Ikhsan1, R. Ramli and A. Alias (2015) [3] the authors have carried out the choice of this theme is the extension of use of valve mechanisms and the possibility of using the new simulation program MSC Adams. The aim of this paper is to become familiar with the problems of the valve mechanism, the dynamic analysis and computer simulation. In this paper we described an overview of the problems compiling a mathematical model of the mechanism of the valve timing. After creating a mathematical model was made in the simulation program MSC Adams/View. The equation of motion of a mechanical valve mechanism was compiled Lagrange equations second order. The actual solution procedure that is mentioned in this paper can be applied to solve complex problems and shape of the valve mechanisms.

Darina Hroncová1, Peter Sivák, Ingrid Delyová (2014) [4] the authors have carried out the The main reason for the choice of this theme is the extension of use of valve mechanisms and the possibility of using the new simulation program MSC Adams. The aim of this paper is to become familiar with the problems of the valve mechanism, the dynamic analysis and computer simulation. In this paper we described an overview of the problems compiling a mathematical model of the mechanism of the valve timing. After creating a mathematical model was made in the simulation program MSC Adams/View. The equation of motion of a mechanical valve mechanism was compiled Lagrange equations second order. The actual solution procedure that is mentioned in this paper can be applied to solve complex problems and shape of the valve mechanisms.

Xiaobin Ning, Cuiling Zhao, Jisheng Shen (2010) [5] the authors have carried out the design of a vehicle suspension, which is truly a multi-degree of freedom mechanism, is really challenging. This paper primarily focuses on Kinematics and Dynamic analysis of the system in ADAMS. A specific module of chassis platform is developed to analyze suspension ride comfort on adaptability to different vehicle with ADAMS/Car. The work intention is to make a parametric ADAMS model and then link it to a Knowledge Based Engineering application to facilitate designer to quickly carry out designing iterations in 6 order to reduce development time. The Knowledge Based Engineering software is made using object oriented language called 'Object Definition Language' which is developed using VC++ software languages. The module not only carry through parametric modeling of front and rear suspension and other subsystems of chassis quickly and compactly, but also can carry on the analysis and optimization of various factors those have crucial impact on ride comfort. The module offers two test-bend, vehicle virtual simulation test stand and fourpost test rig. Finally, the module is applied to analyze two kinds of cars which used chassis platform: front and rear frequency determination, pulse inspiration simulation and Broad simulation. The results show that the chassis platform being adopted by two kinds of cars meet the ride comfort requirements.

Peter Frankovský, Darina Hroncová, Ivan Virgala [6] the authors have carried out to develop a functional model of four-member mechanism in ADAMS View software and his following complete kinematics analysis. they analyze the movement of the members of the mechanism. Kinematics analysis was performed analytically and graphically. The mechanism has been also modeled and solution in the program MSC ADAMS View. The next stage is the simulation with a set of different parameters to obtain its kinematics analysis. Finally they gathered the data in this process is compared and evaluated. Finally, the work presents the results with graphical representation of parameters such as speed, distance and acceleration. It allows creating dynamic, kinematics and static analysis of the proposed mechanical systems and helps to optimize and improve their properties. The aim of this article is to create a functional model crank rocker mechanism in ADAMS View software and to make its complete kinematics analysis. The aim is to investigate the movement of individual members of the mechanism and its points.

Kotharu Srinivasa Rao, C R reddy (2020) [7] the author have carried out the blend of ANSYS and ADAMS can improve the accuracy of framework reproduction. In this paper, initial, a link stayed space support, comprising of stay links, segments, and the space bracket, is worked in ANSYS. Second, the modular impartial record (mnf) required in ADAMS is produced by executing the large scale order "ADAMS" and afterward brought into ADAMS programming. Third, the adaptable body in the mnf document is associated with the inflexible body worked in ADAMS through the outside hubs determined in ANSYS, and afterward the dynamic investigation can be done. Accordingly, the heap record required by ANSYS could be acquired by tapping on the menu "Document Export". At long last, the heap record is brought into ANSYS programming by the APDL language and the static examinations relating to various burden steps are completed. The reproduction examination shows a decent presentation and a few outcomes we are keen on are acquired.

Marek Moravič1, Darina Hroncová, Oskar Ostertag (2015) [8] the authors have carried out the numerically solving vertical oscillating of mechanical system of vehicle by kinematic excitation. When simulating in program MSC Adams, 3D model without gravity impact was taken into consideration. Three-dimensional model of mechanical system was replaced by simple solid table. The result of the work is creation of complex instruction of vertical vibration in program MSD Adams/View that is intended for didactic purposes.

III. INTRODUCTION TO ADAMS VIEW SOFTWARE

Designing and analyzing mechanisms is a complex engineering task, typically involving kinematic analysis, dynamic analysis, and structural considerations. Clearly define the purpose of the four-bar mechanism, such as converting rotary motion to linear motion, generating specific trajectories, or amplifying forces. Choose the appropriate type of four-bar mechanism based on your objectives. Common types include the crank-rocker, rocker-crank, and double-rocker. Derive the kinematic equations relating the angles of the joints and positions of

points on the mechanisms. Optimize the mechanism's parameters (link lengths, joint positions, etc.) to meet your design objectives, such as maximizing output speed or minimizing input effort. Ensure that the materials used and the dimensions of the links can withstand the loads and stresses generated during operation. Designing mechanisms in modeling software involves creating a virtual representation of a mechanical system to simulate its behavior. Here are the general steps for designing mechanisms in modeling software: Conceptualization: Begin by defining the purpose and functionality of your mechanism. Understand the desired motion, forces involved, and any constraints. Choose Modeling Software: Select a modeling software tool that suits your needs. Popular options include SolidWorks, Autodesk Inventor, CATIA (Computer Aided Three-Dimensional Interactive Application), or Fusion 360 for 3D mechanical design. Sketch and Design: Create 2D sketches or 3D models of individual components (parts) of your mechanism. Pay attention to dimensions, clearances, and tolerances. Assembly: Assemble the components into a complete mechanism. Define constraints and relationships between parts to simulate their interactions accurately. Kinematics: Set up the kinematics of the mechanism, specifying how different parts move relative to each other. Define joints, such as revolute, prismatic, or cam-follower, to control motion. Load and Boundary Conditions: Apply external forces, torques, or constraints to simulate realworld conditions and interactions with the environment. Material Properties: Assign material properties to parts if you plan to perform stress analysis, deformation, or other mechanical simulations. Simulation: Run simulations to test the motion and behavior of your mechanism. Observe how it moves, whether it meets your design goals, and if there are any issues like interference or collisions. Analysis: Analyze simulation results to identify potential problems or areas for improvement. Check for excessive stresses, vibrations, or undesirable behavior. Iterate: Based on your analysis, make design modifications as needed. Adjust dimensions, part shapes, or assembly constraints to optimize performance. Documentation: Create documentation, including assembly drawings, bill of materials (BOM), and reports summarizing your design process and simulation results. Validation: If possible, validate your design through physical prototyping and testing to ensure it behaves as expected in the real world. Finalize Design: Once you are satisfied with the design and simulation results, finalize your design for production. Remember that the specific steps and features available may vary depending on the modeling software you choose. The goal is to use the software to create a virtual prototype of your mechanism, test its performance, and iterate on the design until it meets your requirements and objectives. Use software tools like MATLAB (Matrix laboratory), SolidWorks, or specialized kinematics/dynamics software to simulate and visualize the mechanism's motion and forces. Prototype and Build a physical prototype if required and perform real-world testing to validate your design and analysis. Based on test results and simulations, iterate on your design to improve its performance, efficiency, or reliability. Document your design, analysis, and results comprehensively, including drawings, equations, simulations, and test data. ADAMS stands for Automatic Dynamic Analysis of Mechanical Systems and was originally developed by Mechanical Dynamic Inc.(MDI).Models are built in text format and then submitted into ADAMS/Solver. In the early 90's, ADAMS/View was released which allowed users to build, simulate and examine results in a single Graphical User Environment(GUI). Design and analyzing a four-bar mechanism using Adams View software typically involves several steps. Adams View is a powerful tool for dynamic analysis of mechanical systems. Analyzing a four-bar mechanism using Adams software involves simulating the motion of the mechanism and examining various aspects such as kinematics, dynamics simulation software commonly used for this purpose. Adams offers a range of analysis tools and features to help you thoroughly analyze the four-bar mechanism's behavior and performance. The specific steps and settings may vary depending on the complexity of the mechanism and the objectives of the analysis.

IV. DESIGN AND ANALYSIS OF FOUR-BAR MECHANISM

Analyzing a four-bar mechanism using Adams View software typically involves several steps. Adams View is a powerful tool for dynamic analysis of mechanical systems. Here's a brief overview of the procedure. Begin by creating a 3D model of the six-bar mechanism in Adams View. You'll need to define the geometry, dimensions, and constraints accurately. Specify the joints and constraints that govern the movement of the mechanism. Ensure that you accurately represent the type of connections between the bars and their degrees of freedom. Specify the desired motion or input parameters for your analysis. You might want to simulate the mechanism's motion under specific conditions or control inputs. Configure the simulation settings, such as time step, solver options, and numerical integration methods. Ensure that the settings are appropriate for your analysis. Execute the simulation in Adams View. The software will compute the dynamic behavior of the six-bar mechanism based on your inputs and constraints. Analyze the results generated by the simulation. Adams View provides various output options, including animations, graphs, and data tables. You can use these outputs to study motion, forces, velocities, and other relevant parameters. Depending on the results, you may need to make adjustments to your model, constraints, or input parameters. Re-run the simulation to refine your analysis. Validate your simulation results by comparing them with experimental data if available. This step ensures that your model accurately represents the real-world behavior of the mechanism. Document your analysis process, including model details, simulation settings, and results. Create reports or presentations to communicate your findings effectively.

4.1 DESIGN OF FOUR-BAR MECHANISM IN ADAMS VIEW

ADAMS stands for Automatic Dynamic Analysis of Mechanical Systems. Adams View is a powerful tool for dynamic analysis of mechanical systems. Analyzing a four-bar mechanism using Adams software involves simulating the motion of the mechanism and examining various aspects such as kinematics, dynamics simulation software commonly used for this purpose. Designing and analyzing four-bar mechanisms is a complex engineering task, typically involving kinematic analysis, dynamic analysis, and structural considerations. Clearly define the purpose of the four-bar mechanism, such as converting rotary motion to linear motion, generating specific trajectories, or amplifying forces. Choose the appropriate type of four-bar mechanism based on your objectives. Common types include the crank-rocker, rocker-crank, and double-rocker. Derive the kinematic equations relating the angles of the joints and positions of points on the mechanisms. Optimize the mechanism's parameters (link lengths, joint positions, etc.) to meet your design objectives, such as maximizing output speed or minimizing input effort. Ensure that the materials used and the dimensions of the links can withstand the loads and stresses generated during operation. Procedure for designing the four-bar linkage mechanism by using Adams View software are as follows; Model Creation: Begin by creating a 3D model of the six-bar mechanism in Adams View. You'll need to define the geometry, dimensions, and constraints accurately. Import CAD models if available. Define Joints and Constraints: Specify the joints and constraints that govern the movement of the mechanism. Ensure that you accurately represent the type of connections between the bars and their degrees of freedom. Define Motion: Specify the desired motion or input parameters for your analysis. You might want to simulate the mechanism's motion under specific conditions or control inputs. Simulation Setup: Configure the simulation settings, such as time step, solver options, and numerical integration methods. Ensure that the

settings are appropriate for your analysis. **Run Simulation:** Execute the simulation in Adams View. The software will compute the dynamic behavior of the four-bar mechanism based on your inputs and constraints. **Data Output:** Analyze the results generated by the simulation. Adams View provides various output options, including animations, graphs, and data tables. You can use these outputs to study motion, forces, velocities, and other relevant parameters. **Iterate and Refine:** Depending on the results, you may need to make adjustments to your model, constraints, or input parameters. **Re-run the simulation to refine your analysis.** **Kinematics Analysis:** Perform a Kinematic analysis to study the motion of the four-bar mechanism. Adams will compute the positions, velocity, and accelerations of all components as the mechanism moves through its range of motion. **Dynamics Analysis:** If you want to analyse the forces and torques within the mechanism during motion, conduct a dynamics analysis. This will provide insights into the internal stresses and loads experienced by the components. **Sensitivity Analysis:** Explore how changes in design parameters, such as link lengths or input velocities, affect the mechanism's performance. Adams allows you to set up parameter sweeps or optimization studies for this purpose. **Validation:** Validate your simulation results by comparing them with experimental data if available. This step ensures that your model accurately represents the real-world behavior of the mechanism. **Report and Documentation:** Document your analysis process, including model details, 23 simulation settings, and results. Create reports or presentations to communicate your findings effectively.

Table 4.1 Details and dimensions of four bar linkage mechanism

Parts	Name	Colours	Dimensions in mm
Part-1	AD	Dark Blue	400 mm
Part-2	AB	Red	200 mm
Part-3	BC	Green	400 mm
Part-4	CD	Yellow	200 mm

The above table 4.1 shows the details and dimensions of four bar linkage mechanism which are used in the design and analysis of fourbar mechanism in Adams view software.

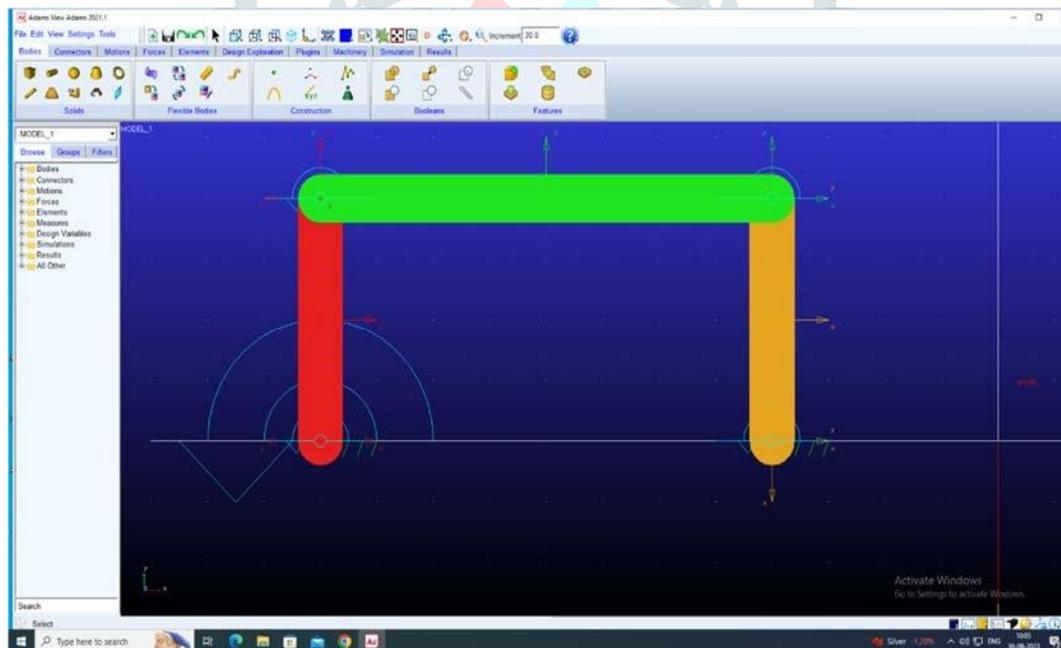


Figure 4.1 Front View of four Bar Linkage Mechanism (Adams Software)

The above figure 4.1 shows the Parts 1 to 4 of four bar linkage mechanism by using Adams software as been shown as per the dimensions, in the Adams software the front view of four bar linkage mechanism as been presented.

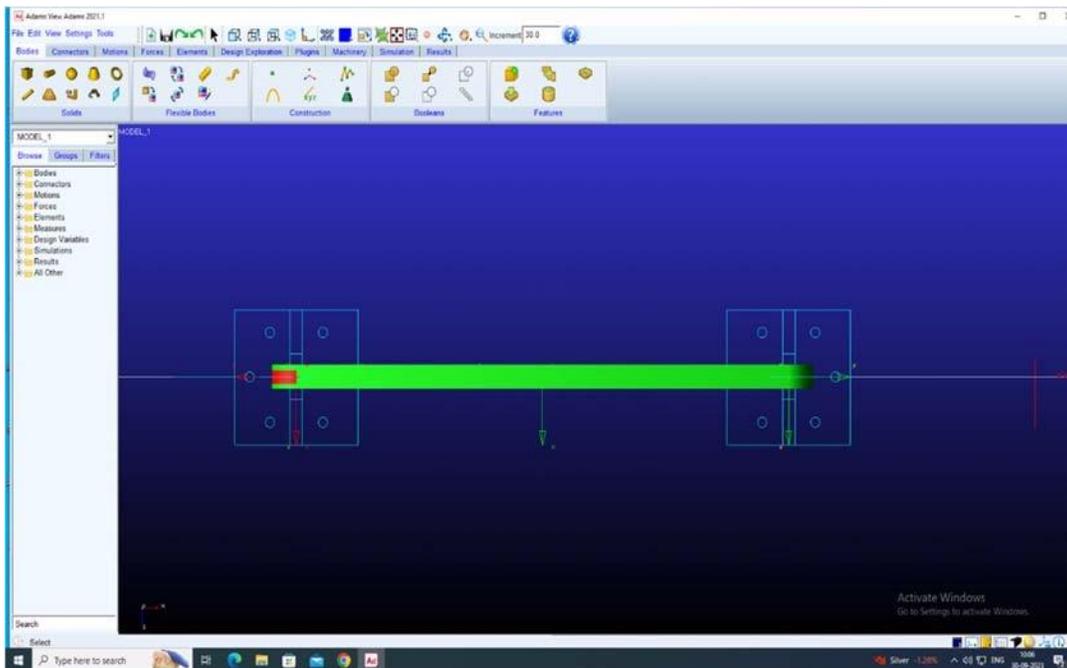


Figure 4.2 Top View of four Bar Linkage Mechanism (Adams Software)

The above figure 4.2 shows the Parts 1 to 4 of four bar linkage mechanism by using Adams software as been shown as per the dimensions, in the Adams software the top view of four bar linkage mechanism as been presented.

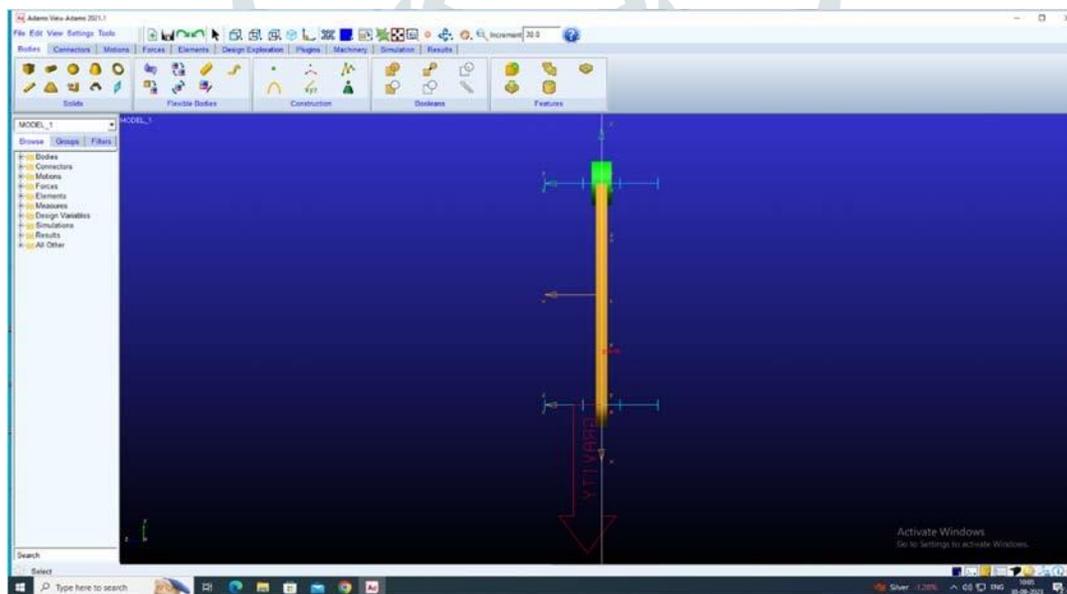


Figure 4.3 Right View of four Bar Linkage Mechanism (Adams Software)

The above figure 4.3 shows the Parts 1 to 4 of four bar linkage mechanism by using Adams software as been shown as per the dimensions, In the Adams software the right view of four bar linkage mechanism as been presented.

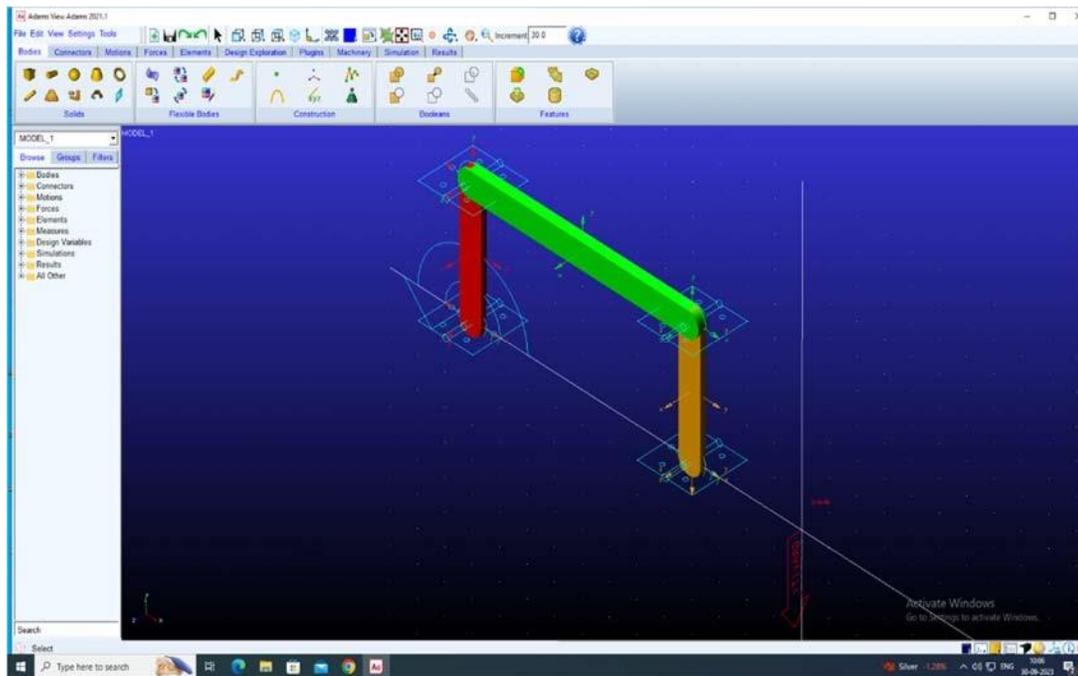


Figure 4.4 Isometric View of four Bar Linkage Mechanism (Adams Software)

The above figure 4.4 shows the Parts 1 to 4 of four bar linkage mechanism by using Adams software as been shown as per the dimensions, In the Adams software the Isometric view of four bar linkage mechanism as been presented.

4.2 ANALYSIS OF FOUR-BAR MECHANISM IN ADAMS VIEW

ADAMS (Automatic Dynamic Analysis of Mechanical Systems) is a powerful software tool for simulating and analyzing the dynamic behavior of mechanical systems, including four-bar mechanisms. It is important to have a good understanding of mechanical principles, systems dynamics, and the specifics of four-bar mechanism to effectively use ADAMS for analysis and simulation. Analyzing a four-bar mechanism using Adams software involves simulating the motion of the mechanism and examining various aspects such as kinematics, dynamics, and performance characteristics. Adams is a powerful multibody dynamics simulation software commonly used for the purpose of analysis. Adams offers a range of analysis tools and features to help you thoroughly analyze the four-bar mechanism's behavior and performance. The specific steps and settings may vary depending on the complexity of your mechanism and the objectives of your analysis. Adams View is a software application that is a part of the Adams simulating suite, developed by MSC Software Corporation. Adams is a widely used tool in the field of mechanical engineering for simulating and analyzing the dynamic behavior of mechanical systems, including mechanisms, assemblies, and multibody systems. Adams View, specifically, is the graphical user interface (GUI) for creating, setting up, and visualizing simulations within the Adams environment. Adams View provides a user-friendly environment for setting up and running simulations of complex mechanical systems. It offers a graphical interface that allows engineers and designers to work with ease. The core capability of Adams is multibody dynamics simulation. It enables and analyze the motion of interconnected bodies, such as rigid bodies, flexible bodies, and joints, under the influence of forces and constraints. Users can perform detailed motion analysis to understand how a mechanical system moves, including kinematics (position, velocity, acceleration) and dynamics (forces and torques) analysis. Adams View supports the modelling of flexible bodies, which is essential for simulating systems where deformation or flexibility plays a significant role, such as a automotive suspensions and aerospace structures. It allows for the simulation of contact and collision between bodies, providing insights into how components interact and how forces are transmitted during impact. Adams View can be used to simulate control systems, allowing users to evaluate the performance of controllers in real world mechanical systems. One of the strength of Adams View is its visualization capabilities. It provides 3D rendering of the simulated mechanical systems, making it easy to visualize and understand the system's behavior. The software includes tools for preprocessing tasks like model creation, assembly building, and specifying simulation parameters. Additionally, it offers post-processing capabilities for analyzing simulation results, generating report, and creating animations. Adams View supports optimization studies, allowing users to optimize design parameters for improved system performance. Sensitivity analysis can also be performed to understand how changes in parameters affect the system's behavior. Adams View can be integrated with other engineering software tools, such as finite element analysis (FEA) software, to perform co-simulation, where the mechanical behavior in Adams can be coupled with structural analysis. Adams View is used in various industries, including automotive, aerospace, robotics, and manufacturing, for simulating and optimizing the performance of mechanical systems and improving product designs. Adams View is a powerful simulation tool that simplifies the process of modelling and analyzing the dynamic behavior of mechanical systems. It is widely used in engineering and product development to assess the performance and reliability of complex mechanical designs, ultimately leading to better engineered products. Adams View provides a user-friendly environment for setting up and running simulations of complex mechanical systems. It offers a graphical interface that allows engineers and designers to work with ease. The core capability of Adams is multibody dynamics simulation. It enables and analyze the motion of interconnected bodies, such as rigid bodies, flexible bodies, and joints, under the influence of forces and constraints.

4.2.1 ANALYSIS OF POSITION, VELOCITY AND ACCELERATION OF PART 2

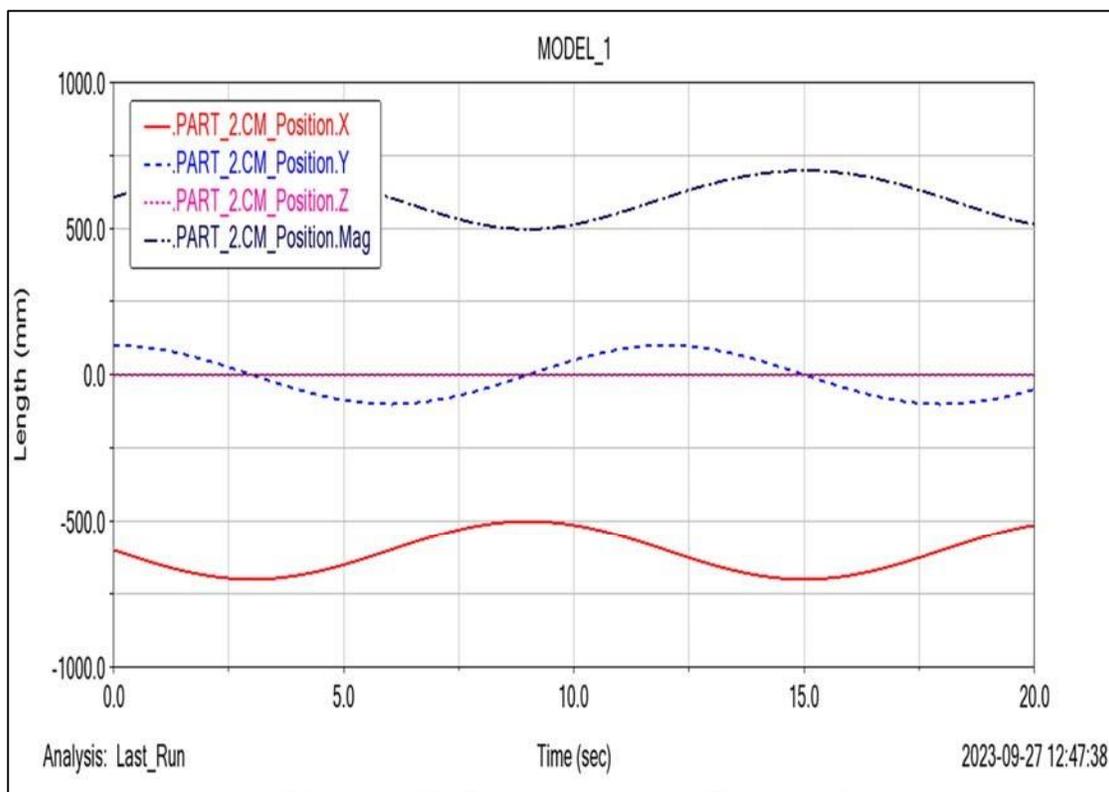


Figure 4.5: Part 2 Position in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.5 shows the Part 2 of four bar linkage mechanism Position in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

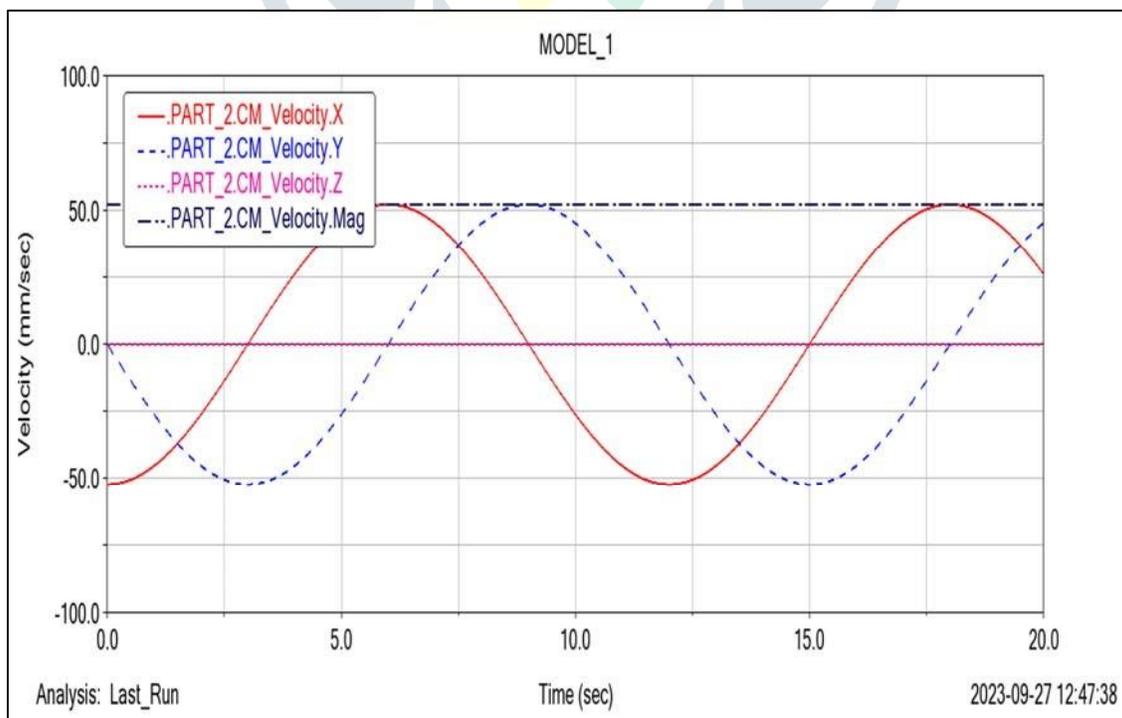


Figure 4.6: Part 2 velocity in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.6 shows the Part 2 of four bar linkage mechanism velocity in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

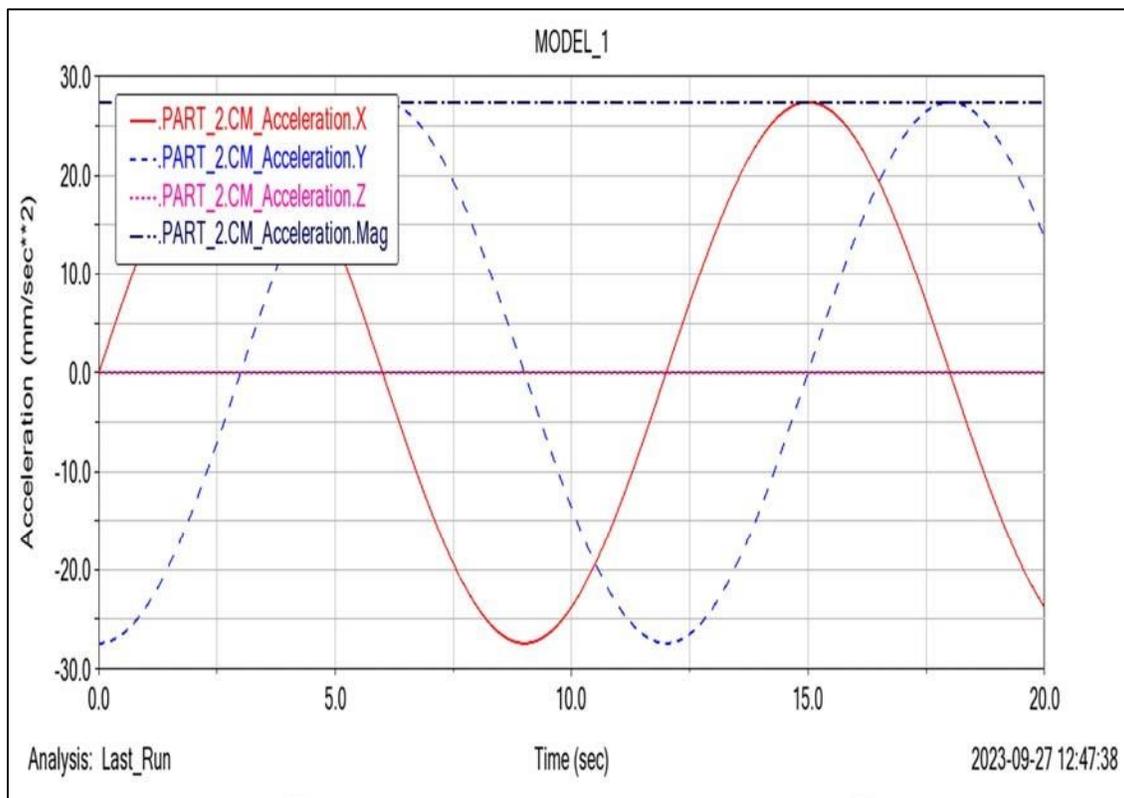


Figure 4.7: Part 2 acceleration in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.7 shows the Part 2 of four bar linkage mechanism acceleration in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

4.2.2 ANALYSIS OF POSITION, VELOCITY AND ACCELERATION OF PART 3

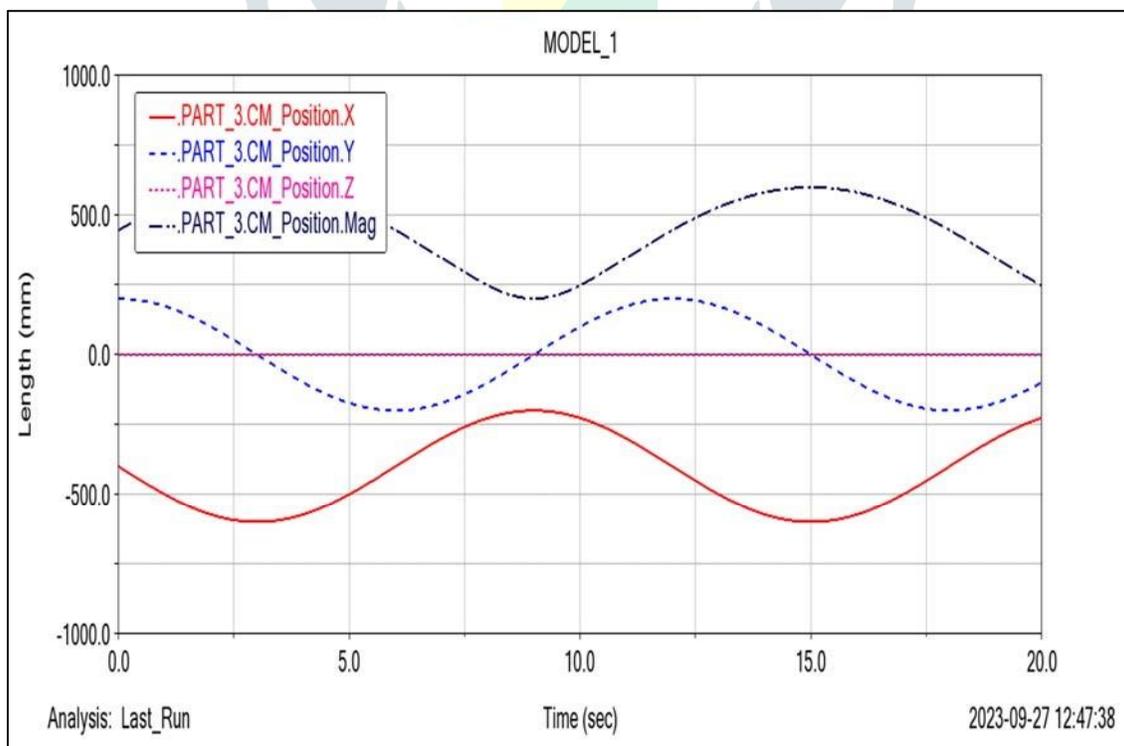


Figure 4.8: Part 3 Position in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.8 shows the Part 3 of four bar linkage mechanism Position in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

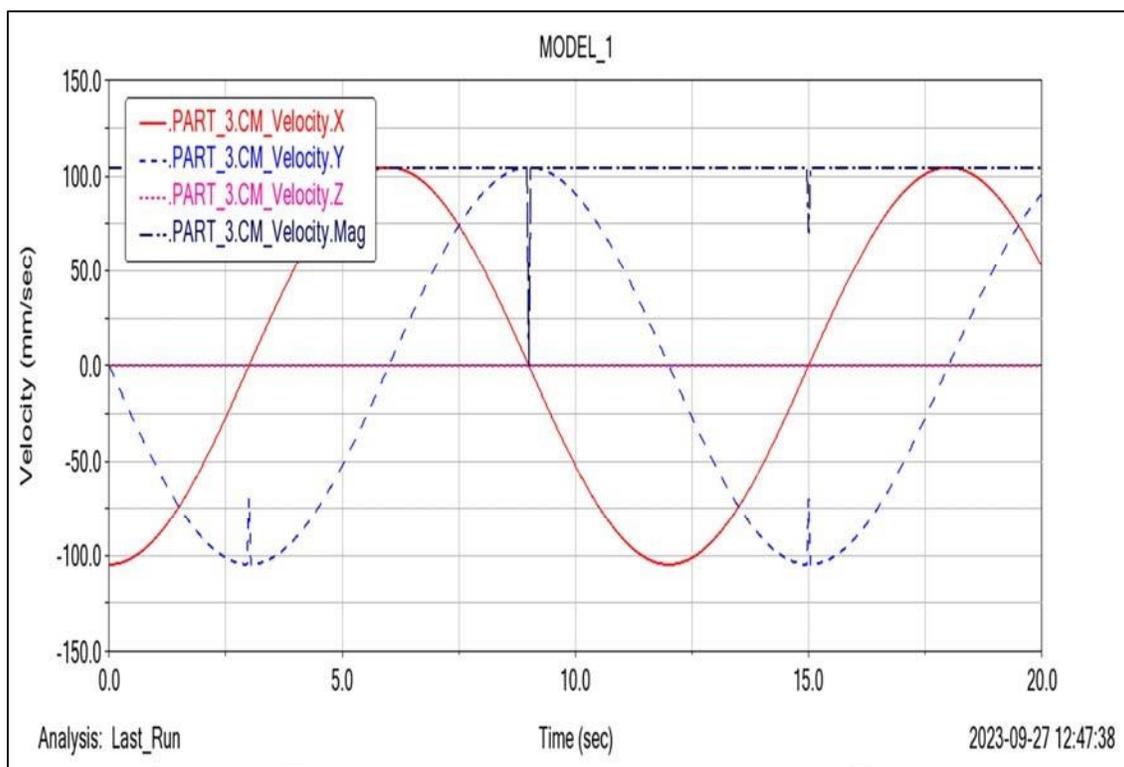


Figure 4.9: Part 3 velocity in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.9 shows the Part 3 of four bar linkage mechanism velocity in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

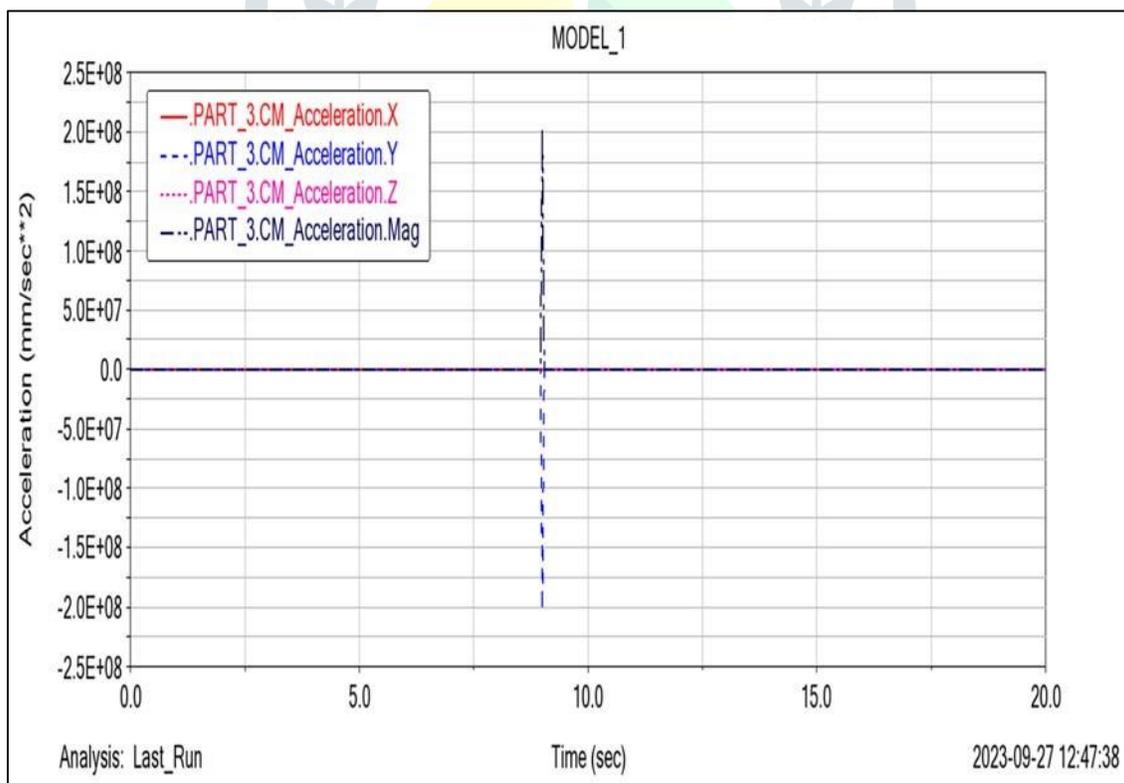


Figure 4.10: Part 3 acceleration in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.10 shows the Part 3 of four bar linkage mechanism acceleration in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

4.2.3 ANALYSIS OF POSITION, VELOCITY AND ACCELERATION OF PART 4

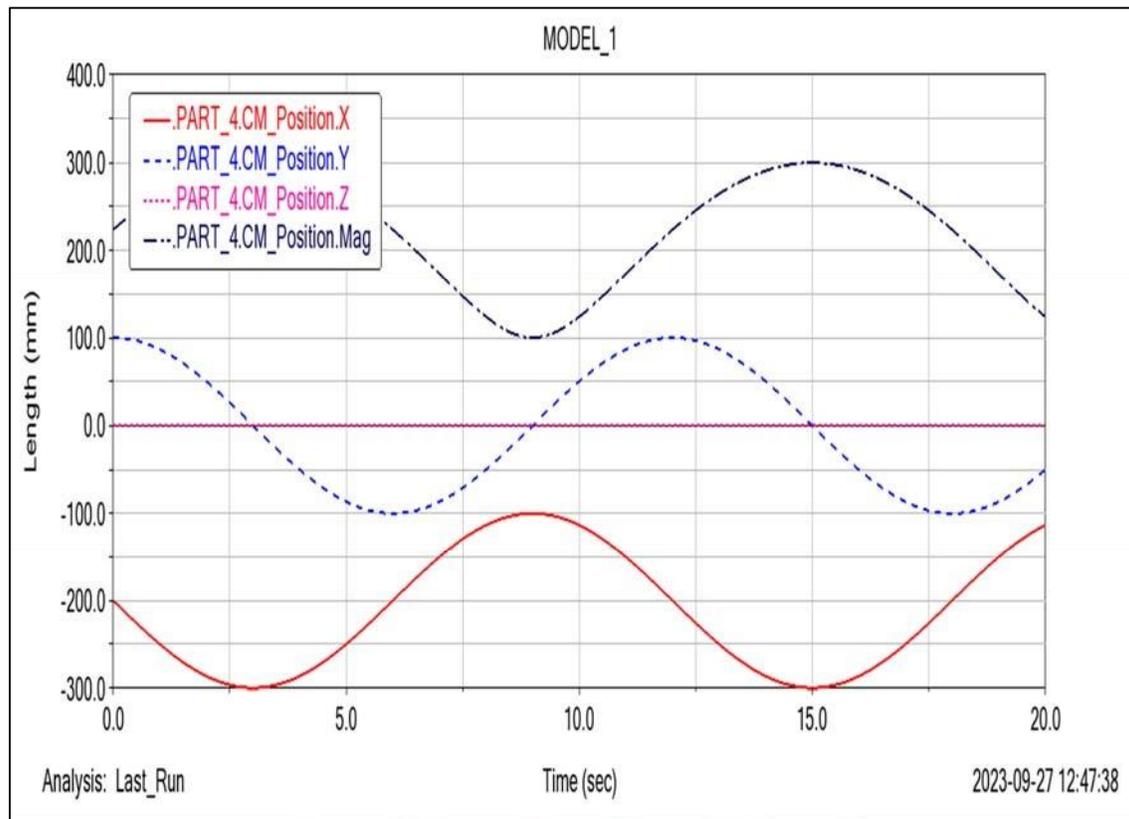


Figure 4.11: Part 4 Position in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.11 shows the Part 4 of four bar linkage mechanism Position in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

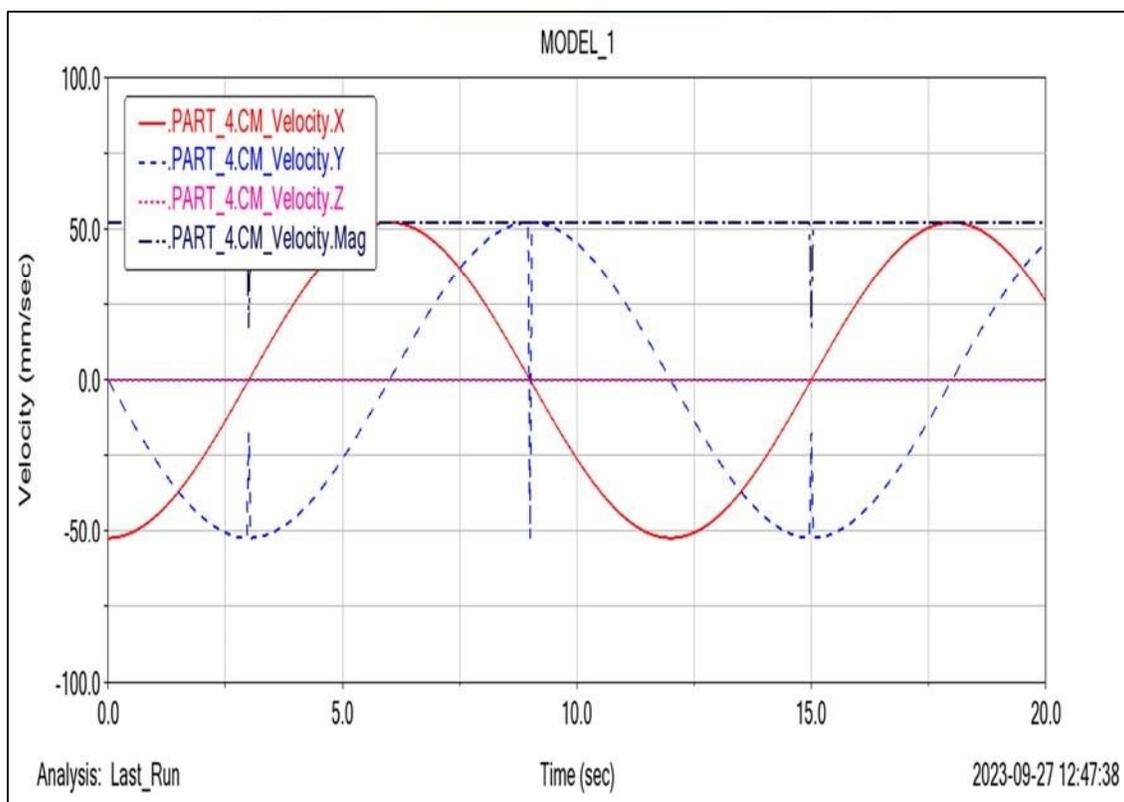


Figure 4.12: Part 4 velocity in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.12 shows the Part 4 of four bar linkage mechanism velocity in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

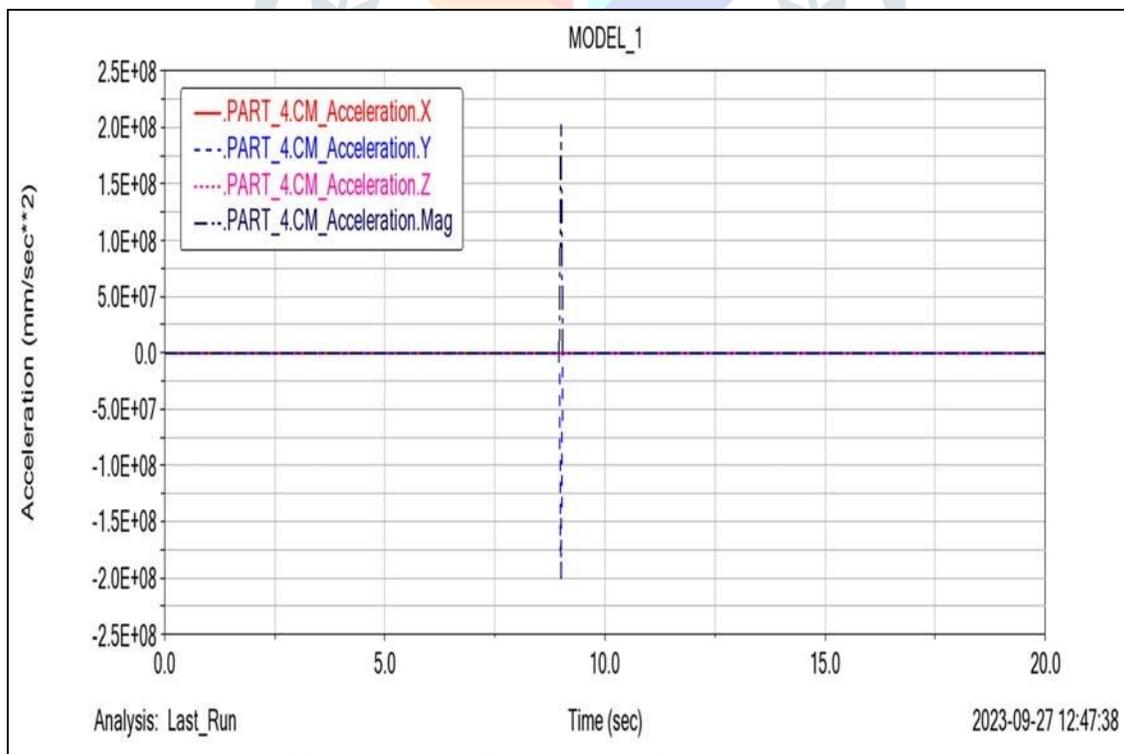


Figure 4.13: Part 4 acceleration in X, Y, Z and Magnitude Analysis with graph in Adams view.

The above Figure 4.13 shows the Part 4 of four bar linkage mechanism acceleration in X, Y, Z and Magnitude analysis along with the graph in Adams software as been presented.

V. RESULTS AND DISCUSSION

The present study four bar mechanism involved determination of position, velocity and acceleration characteristics of crank, coupler and output link Using ADAMS software. The obtained result from the software are presented in graph which represent the mechanism behavior and its working aspects. The design and analysis of a four-bar mechanism using Adams software has proven to be a valuable and insightful endeavor. Adams was instrumental in conducting Kinematic simulations and analysis of the four-bar mechanism. Adams powerful simulation capabilities allowed for the investigation of the four Bar Mechanism behavior under different Position, Velocity, and Acceleration conditions.

VI. CONCLUSION

This Adams view was crucial in optimizing the design for desired performance characteristics and ensuring the four Bar mechanism reliability in real-world applications. By using Adams view we can get more accurate Graphs due to this we can save our valuable time in the overall process. The Kinematic simulation of Adams view collectively provided a comprehensive solution for achieving a robust and well performing four Bar Mechanism. The Adams view approach is not only valuable for engineers and designers but also opens up opportunities for innovation and optimization in various engineering applications.

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