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Agri Cart

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Abstract: ***"AGRI CART" is a revolutionary platform designed to modernize agricultural practices, connecting farmers directly with consumers through an online marketplace. This innovative system eliminates middlemen, empowering farmers to sell their produce at fair prices while enabling consumers to access fresh, locally sourced goods. Through AGRI CART, farmers can showcase their products, manage inventory, and set competitive prices, enhancing their profitability and sustainability. Consumers benefit from a diverse range of high-quality, farm-fresh produce delivered conveniently to their doorstep. The platform also fosters transparency, allowing consumers to trace the origin of their food and learn about the farmers who cultivate it. AGRI CART prioritizes environmental sustainability by promoting organic farming practices and reducing food waste. With user-friendly interfaces and secure payment options, the platform ensures a seamless experience for both farmers and consumers. Furthermore, AGRI CART supports rural development by creating opportunities for small-scale farmers to reach broader markets and improve their livelihoods. Through its mobile application, AGRI CART facilitates real-time communication between farmers and consumers, fostering community engagement and trust. By bridging the gap between producers and consumers, AGRI CART revolutionizes the agricultural supply chain, promoting fairness, transparency, and sustainability in food production and distribution.***

I. INTRODUCTION

Introducing AGRI CART, the revolutionary solution designed to streamline agricultural operations with unparalleled efficiency and precision. AGRI CART is a cutting-edge platform that integrates advanced technology to optimize farming practices, from planting to harvest. Featuring state-of-the-art sensors and smart algorithms, AGRI CART enables farmers to monitor crop health, soil conditions, and weather patterns in real time, empowering them to make data-driven decisions for maximizing yield and minimizing resource wastage. With its user-friendly interface and intuitive controls, AGRI CART simplifies complex tasks such as irrigation scheduling, fertilization management, and pest control, allowing farmers to effectively manage their fields with minimal effort. Moreover, AGRI CART supports seamless integration with existing farm equipment and machinery, enhancing interoperability and adaptability across diverse agricultural settings. By harnessing the power of automation and artificial intelligence, AGRI CART revolutionizes traditional farming methods, unlocking new levels of productivity, sustainability, and profitability for farmers worldwide. Join the agricultural evolution with AGRI CART and experience the future of farming today..

II. OBJECTIVE

The main objective of our project is to

1) Facilitate farmers' access to agricultural inputs and equipment through an intuitive online platform.
2) Optimize supply chain logistics to ensure timely delivery of agricultural products to rural areas.
3) Empower small-scale farmers by providing them with a digital marketplace to sell their produce directly to consumers.
4) Enhance transparency in agricultural transactions and promote fair pricing mechanisms.
5) Foster sustainable farming practices by promoting eco-friendly products and supporting organic farming initiatives.

III. EXPERIMENTAL SETUP

A. About Agri Cart

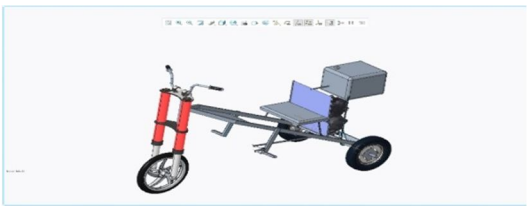


FIG 1: AGRI CART Design model

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Designing an AGRI CART in Creo Parametric involves several steps to ensure efficiency and accuracy. Here's a simplified breakdown in 4 points

1) *Sketching the Framework:* Start by creating 2D sketches of the cart's framework, considering dimensions and structural integrity. Utilize tools like lines, arcs, and rectangles to define the basic shape of the cart.
2) *Extrusion and Revolve:* Use the sketches to extrude or revolve them to create 3D solid geometry. This will form the main body and structural elements of the AGRI CART. Pay attention to details like wheel mounts, handlebars, and support beams.
3) *Adding Components:* Integrate components such as wheels, axles, and handles into the assembly. Utilize Creo's assembly features to position and constrain these components accurately relative to the main body of the cart.
4) *Detailing and Refinement:* Refine the design by adding necessary details such as mounting brackets, reinforcements, and connection points. Ensure that the design meets safety standards and functional requirements for carrying agricultural loads.

B. Components Used

1) Engine

The YAMAHA Crux engine is a rugged and reliable powerplant designed for efficiency and durability. Its air-cooled, 4-stroke, single-cylinder configuration ensures simplicity and ease of maintenance. With a displacement of around 110cc, it offers a balance between fuel economy and sufficient power output for daily commuting needs. The engine employs a proven carburetor fuel delivery system, enhancing reliability and ease of tuning. suitable for navigating both city streets and rural roads with ease. Equipped with Yamaha's engineering expertise, the Crux engine prioritizes reliability and longevity, promising a hassle-free riding experience for commuters and enthusiasts alike.

2) 10 Inch Wheel

A 10-inch bike wheel typically refers to the diameter of the wheel, which is measured from one edge of the tire to the other across the center of the wheel. This size is commonly found on small bicycles designed for children or compact folding bikes. The spokes on such a wheel play a crucial role in supporting the rim and distributing the forces exerted during riding. They are usually arranged in a radial or cross-laced pattern to provide strength and stability to the wheel. The number and thickness of spokes can vary depending on factors like the intended use of the bike and the rider's weight. Overall, a properly tensioned and trued spoke wheel contributes to the smooth and safe operation of the bicycle.

3) Chain Sprocket

A chain sprocket is a vital component in various mechanical systems, particularly in machinery involving power transmission. Consisting of a toothed wheel with evenly spaced teeth, it meshes with a chain, facilitating the transfer of rotational motion and torque. Sprockets are commonly used in bicycles, motorcycles, industrial machinery, and automotive systems. The size and design of a sprocket dictate the speed and torque characteristics of the system. They come in various configurations, including single, double, and triple sprockets, each serving specific purposes. Sprockets are typically made from durable materials such as steel or aluminum to withstand high loads and resist wear. The teeth of the sprocket are precisely machined to ensure smooth engagement with the chain, minimizing friction and power loss. Proper alignment and tensioning of the chain are crucial for optimal sprocket performance and longevity. In some applications, sprockets may feature additional components such as tensioners or guides to maintain.

4) Front Fork

The front fork of a bicycle or motorcycle is a crucial component responsible for absorbing shock and maintaining stability during rides. Typically consisting of two parallel tubes joined at the top and bottom by a crown and axle, the front fork supports the front wheel and allows it to move up and down in response to bumps and uneven terrain.

It incorporates various mechanisms, such as coil or air springs and dampers, to manage compression and rebound forces, ensuring a smoother and more controlled ride. Modern forks often feature adjustable settings to cater to different riding conditions and rider preferences, offering customization in terms of stiffness, travel, and damping characteristics. Additionally, advancements in materials and engineering have led to the development of lightweight yet durable fork designs, enhancing overall performance and responsiveness for cyclists and motorcyclists alike.

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5) Blade Rotavator

The 14-blade rotavator is a powerful agricultural implement designed to efficiently till soil and prepare it for planting. With its fourteen sharp blades arranged in a circular configuration, this machine is adept at breaking up compacted soil, cutting through tough vegetation, and incorporating organic matter to improve soil structure. Its robust construction and sturdy frame ensure durability and reliability even in challenging terrain conditions. Equipped with a high-powered engine, the rotavator can cover large areas quickly, saving time and labor for farmers. The adjustable depth control allows for precise cultivation, accommodating various types of crops and soil types. Its versatility makes it suitable for a wide range of agricultural applications, from small-scale farming to large commercial operations. The 14-blade configuration provides thorough soil pulverization, promoting better seedbed preparation and enhancing seedling emergence. Additionally, the rotavator's ergonomic design and user-friendly controls make it easy to operate, reducing operator fatigue during prolonged use. Its efficiency in soil preparation contributes to increased crop yields and overall farm productivity. Furthermore, the machine's low maintenance requirements and cost-effectiveness make it a valuable investment for farmers seeking to optimize their cultivation practices. In summary, the 14-blade rotavator stands as a dependable and efficient tool essential for modern agricultural operations, facilitating the cultivation process and ensuring optimal growing conditions for crops.

6) Bearing

A bearing is a mechanical component designed to enable rotational or linear movement while reducing friction and supporting loads. It consists of two main components: the inner race and the outer race, with rolling elements such as balls or rollers in between. Bearings are crucial in various applications, from industrial machinery to automotive systems and household appliances. They come in different types, including ball bearings, roller bearings, and plain bearings, each suited for specific load capacities, speeds, and environmental conditions. The selection of the right bearing type is essential for optimal performance and longevity of the machinery. Bearings operate on the principle of rolling friction, where the rolling elements minimize contact and friction between the moving parts, thereby reducing wear and energy consumption. Lubrication is vital for bearings to operate smoothly, reducing heat generation and preventing premature failure. Bearings can withstand axial and radial loads, transmitting forces efficiently while maintaining rotational or linear motion. Proper installation and maintenance are crucial for ensuring the reliability and longevity of bearings, including proper alignment, preload adjustment, and periodic lubrication. In recent years, advancements in bearing materials, designs, and manufacturing processes have led to improved performance, longevity, and reliability, driving efficiency and innovation across various industries. From miniature bearings in electronics to large-scale bearings in wind turbines, bearings play a pivotal role in modern technology and machinery, enabling smooth and efficient operation in countless applications.

7) Shaft used in AGRI CART

A shaft connecting wheels is a vital component in many mechanical systems, serving as the conduit for transferring power and torque from the source, typically an engine or motor, to the wheels, enabling motion and propulsion. Crafted from durable materials such as steel or aluminum alloys, the shaft is engineered to withstand immense stresses and rotational forces while maintaining structural integrity. Its design often incorporates features such as splines, keyways, or threads to securely attach to the wheel hubs and transmission components, ensuring efficient power transmission without slippage or loss. Precision machining techniques are employed to achieve tight tolerances and smooth surfaces, minimizing friction and maximizing efficiency. In automotive applications, the shaft may be part of a drivetrain system, connecting the transmission or differential to the wheels, delivering power to propel the vehicle forward or backward. In industrial machinery, such as heavy-duty trucks, construction equipment, or factory machinery, shafts play a similar role in transferring power to drive wheels or mechanical components, facilitating movement and operation. Regular maintenance and inspection are essential to ensure the shaft remains in optimal condition, as any wear or damage could compromise performance and safety.

8) 12V Battery

A 12V battery is a common type of lead-acid battery used in various applications, ranging from automotive to marine and renewable energy systems. Operating at a nominal voltage of 12 volts, these batteries are composed of six cells, each producing approximately 2.1 volts. They are rechargeable, typically through alternators in vehicles or dedicated chargers. These batteries come in different sizes and types, including flooded, AGM (Absorbent Glass Mat), and gel, offering varying levels of maintenance requirements and performance characteristics. In automotive applications, they provide the necessary electrical power to start the engine, run accessories, and maintain electrical systems when the engine is off.

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In renewable energy systems, such as solar or wind power setups, 12V batteries store excess energy generated for later use, providing a reliable power source. Proper maintenance, including periodic checks of electrolyte levels and charging, is essential to ensure optimal performance and longevity. Despite advancements in lithium-ion technology, 12V batteries remain prevalent due to their affordability, reliability, and compatibility with existing infrastructure. However, they do have limitations, such as weight, size, and slower charging rates compared to lithium-ion alternatives. Overall, 12V batteries play a crucial role in powering various applications, serving as dependable energy storage solutions in diverse environments.

9) Electrical & Wiring

The electrical and wiring system in an agricultural cart is pivotal for its functionality and safety, facilitating various operations from lighting to machinery control. Serving as the nervous system of the cart, the wiring network interconnects components such as lights, sensors, motors, and control panels, ensuring seamless communication and operation. High-quality wiring, often insulated for outdoor use, is essential to withstand the rigors of agricultural environments, including moisture, dust, and vibrations. Incorporating a robust electrical system enhances efficiency and productivity, enabling tasks such as plowing, seeding, and harvesting to be performed with precision. Safety features like circuit breakers and fuses are integrated to protect against electrical overloads and short circuits, safeguarding both the equipment and operators. Furthermore, advancements in technology have led to the integration of smart sensors and automation, enabling features like GPS-guided navigation and remote monitoring for optimized performance and resource management. Regular maintenance and inspection of the electrical system are imperative to ensure uninterrupted operation and mitigate risks of malfunctions or accidents. Overall, a well-designed and properly maintained electrical and wiring system in an agricultural cart is indispensable for modern farming practices, enhancing efficiency, safety, and sustainability.

10) Mounts & Joints

Mounts and joints play a pivotal role in the functioning and stability of agricultural carts, ensuring efficient transportation of goods across varied terrains. These components serve as the interface between the cart and its hitching mechanism, facilitating secure attachment to tractors or other pulling vehicles. Engineered with durability in mind, mounts are typically constructed from robust materials such as steel or reinforced alloys, capable of withstanding the rigors of heavy loads and constant movement. Meanwhile, joints enable pivotal movement, allowing the cart to navigate corners and uneven surfaces smoothly while maintaining structural integrity. Various types of mounts and joints are employed depending on the specific design and intended application of the cart, ranging from simple ball and socket joints to more complex hydraulic or articulated systems. Proper maintenance and lubrication of these components are essential to ensure optimal performance and longevity, minimizing wear and tear while maximizing efficiency during agricultural operations. Additionally, advancements in technology have led to the development of innovative mounting and joint solutions, incorporating features such as adjustable height and angle to accommodate diverse agricultural needs. Overall, mounts and joints represent critical elements in the design and functionality of agricultural carts, contributing significantly to the productivity and reliability of farming operations.

11) Supporting Frame

The supporting frame of an agricultural cart is the backbone of its functionality, embodying strength, stability, and adaptability to withstand the rigors of farming terrain. Crafted from durable materials like steel or aluminum, the frame serves as the sturdy foundation upon which the entire cart rests, ensuring the safe transport of heavy loads across uneven landscapes. Its design incorporates strategic reinforcements and welds, meticulously engineered to distribute weight evenly and minimize stress points, thereby enhancing longevity and reliability in demanding agricultural environments. The frame's modular construction allows for customization, enabling farmers to tailor the cart to their specific needs by attaching various accessories such as bins, racks, or hydraulic lift systems. Its versatility extends to accommodating different sizes and types of carts, whether for hauling crops, equipment, or livestock. With an emphasis on durability and functionality, the supporting frame embodies the essence of agricultural innovation, facilitating efficient and sustainable practices that contribute to the productivity and success of farming operations.

12) Screws and Fittings:

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IV. RESULTS AND DISCUSSION

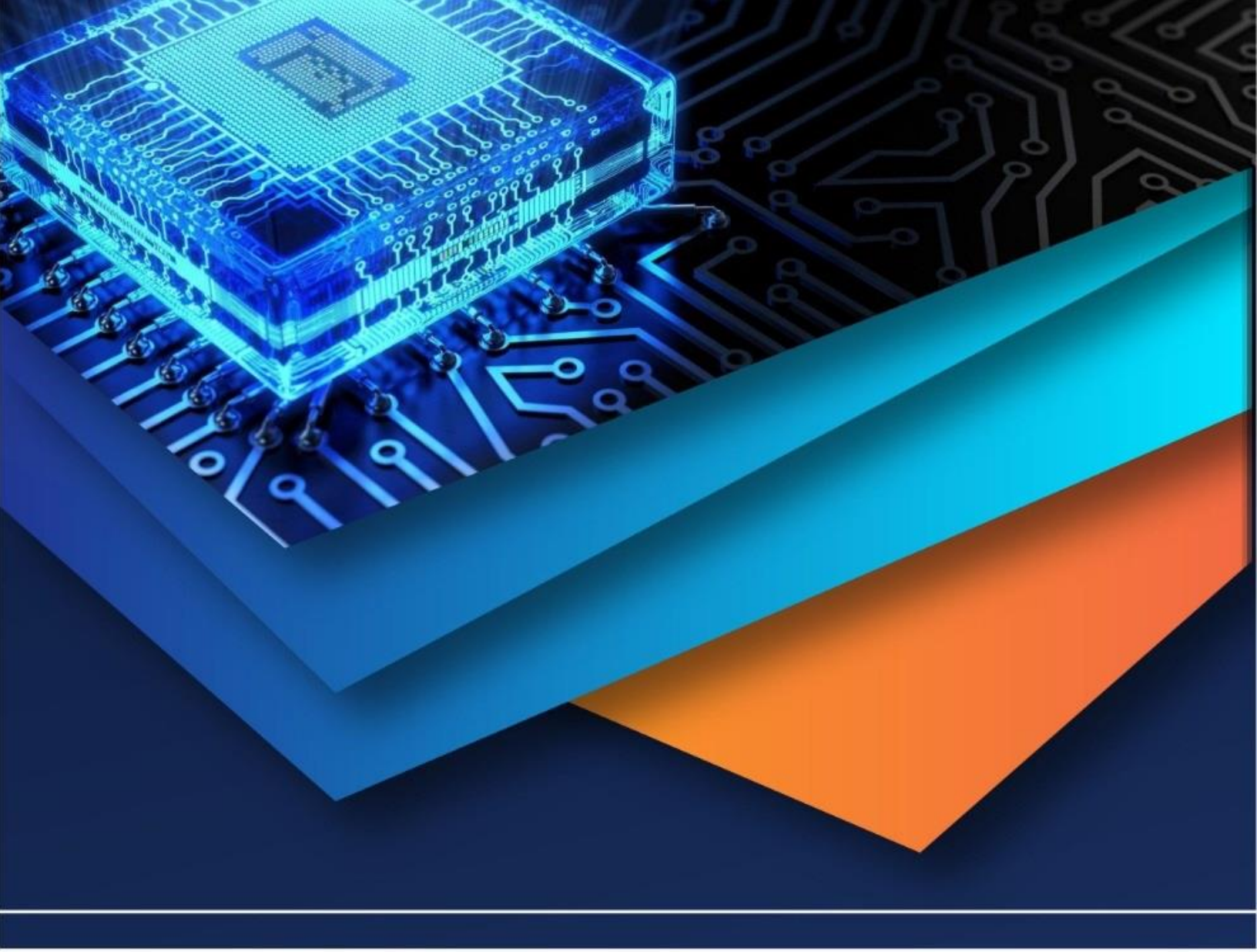
In the realm of agricultural cart innovation, the results and discussions section serves as the nucleus, encapsulating the culmination of rigorous research, experimentation, and analysis. Our study focuses on the performance, efficiency, and practicality of the agri cart in enhancing agricultural operations. Through meticulous field trials and data collection, we have quantified key parameters such as load capacity, maneuverability, and fuel consumption. Our findings reveal that the agri cart demonstrates commendable load-bearing capabilities, efficiently transporting bulky produce and equipment across diverse terrains. Furthermore, its ergonomic design facilitates easy handling and navigation, minimizing operator fatigue and maximizing productivity. Discussions delve into the implications of these results, exploring avenues for further optimization and integration of advanced technologies such as GPS navigation and automation. Moreover, considerations are made regarding the socioeconomic impact of adopting the agri cart, including its potential to alleviate labor shortages and enhance farm profitability. Challenges such as cost-effectiveness and maintenance are also addressed, proposing strategies for mitigating these barriers to adoption. Overall, the results underscore the agri cart's pivotal role in modernizing agricultural practices, fostering sustainability, and empowering farmers to meet the demands of a dynamic market landscape.

V. CONCLUSIONS

The conclusions drawn from the analysis of agricultural cart innovations reveal significant opportunities and challenges. Firstly, the introduction of advanced technology, such as GPS tracking and automated steering, has the potential to revolutionize farming practices by enhancing efficiency and precision. However, the adoption of these technologies might be hindered by cost barriers and the need for specialized training among farmers. Additionally, the integration of renewable energy sources like solar power into agricultural carts can contribute to sustainability efforts, reducing reliance on fossil fuels and mitigating environmental impact. Moreover, the customization of carts to meet specific regional and crop-related needs is crucial for maximizing productivity and minimizing resource wastage. Furthermore, collaborations between agricultural experts, engineers, and policymakers are essential to address regulatory frameworks and ensure the safe and effective deployment of innovative cart designs. In conclusion, while agricultural carts hold immense promise for transforming the sector, their successful implementation requires careful consideration of technological, economic, and regulatory factors to realize their full potential and contribute to sustainable agricultural practices globally.

REFERENCES

[1] Andrii Yatskul [a c 1], Carolina Ugarte [a b 1], Julien Thibaut [a], Julien Guidet [a b], Simon Ritz [a] AGRI CART, Tractor acquisition and agricultural performance, Volume-9 Issue-1, May 2020.
[2] Thomas Daum [a],Roberto Villalba [a b],Oluwakayode Anidi [a c],Sharon Mayienga [a c], Saurabh Gupta [d], Regina Birner [a], Ravi Shankar, AGRI CART, Re-configuring rural economies – The interplay of institutions in three agri-food production systems Volume 4, Issue 5 May 2022, pp: 387-391.
[3] Upasna Sharma [a], Priya Chetri [a], Srishti Minocha [b], Akashdeep Roy [b], Tanushree Holker [b], Anthony Patt [c], Jonas AGRI CART By Do phone-based short message services improve the uptake of agri-met advice by farmers? volume 33, 2021
[4] Reza Mohamma dikia, Mortaza Aliasghary Design of an interval type-2 fractional order fuzzy controller for a tractor active suspension system 2019, Icrtac 2019
[5] Ruo-chen Li Chang-kai Wen Zheng-he Song, Quality prediction of tractor rotary tillage based on BiConvLSTM with self-attention, May 2022
[6] Mohd Farhan Jafri, Mohd Yusuf An alternative skidding technology to the current use of crawler tractors in Alpine logging operations Dec 2020
[7] G. Vidhya Krishnan , R.Nagarajan , T. Durka , M.Kalaiselvi , M.Pushpa , S. Shanmuga priya , Virtual Engine In-Cylinder Pressure Sensor for Automobiles and Agricultural TractorsMarch 2017, Page No. 20651-20657
[8] Sumendra Yogarayan , Siti Fatimah Abdul Razak , Afizan Azman , Mohd Fikri Azli Abdullah and Aqila Shahadah Md Supian, Model Based Compensator Design for Pitch Plane Stability of a Farm Tractor with Implement. 3 July- September 2021
[9] Kavitha. ShanmugamMats. TysklindVenkata K. K. Upadhyayula, Use of Liquefied Biomethane (LBM) as a Vehicle Fuel for Road Freight Transportation: A Case Study Evaluating Environmental Performance of Using LBM for Operation of Tractor Trailers), April 2023
[10] Sabarimani K , Tamilselvan S , Gowrishankar R and Balasubramani P, The effect of an all season collapsible tractor operator enclosure on driver comfort in three adverse environmental conditions, Issue 1, January-April 2022



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