ROVER ROBOT

ALL TERRAIN VEHICLE

INTRODUCTION

This project is inspired from SOLERO ROBOT. Locomotion in rough terrain requires innovative locomotion principles. Various designs have been proposed using legs(walking machines) or other active means to climb over obstacles, complex and require sophisticated active control for locomotion . The “Shrimp” structure is much simpler, thanks to its passive mechanical design. It has one wheel mounted on a fork in the front, one wheel in the rear and two bogies on each side. The parallel architecture of the bogies and the spring suspended fork provide a high ground clearance while keeping all 6 wheels in ground-contact at any time. This ensures excellent climbing capabilities over obstacles much higher than the wheel radius and an excellent adaptation to all sorts of terrains.

FUNCTIONING

The front fork has two functions:

1) Its spring suspension guarantees optimal ground contact of all wheels at any time and its particular parallel mechanism produces a passive elevation of the front wheel if an obstacle is encountered. The front wheel has an instantaneous centre of rotation situated under the wheel axis , which makes it possible to get on an obstacle

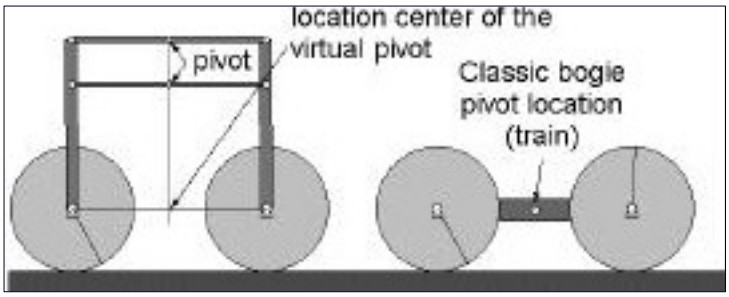
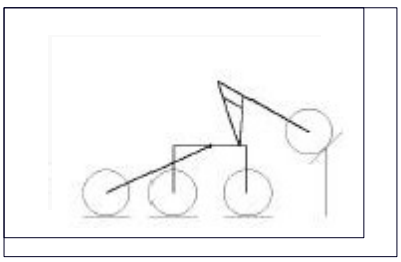

location center of the
virtual pivot
pivot
Classic bogie
pivot location
(train)

Figure 1: Concept of virtual rotation center for the front fork and the bogies

2) The bogies provide the lateral stability. To ensure similarly good ground clearance and climbing capabilities, their virtual centre of rotation is set to the height of the wheel axis using the parallel configuration shown on Fig. 1. The steering of the rover is realized by synchronizing the rotation of the front and rear wheel and the speed difference of the bogie wheels. An irreversible steering mechanism will be developed. This allows keeping the position of the front and
back wheel



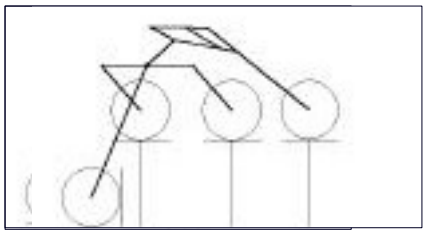
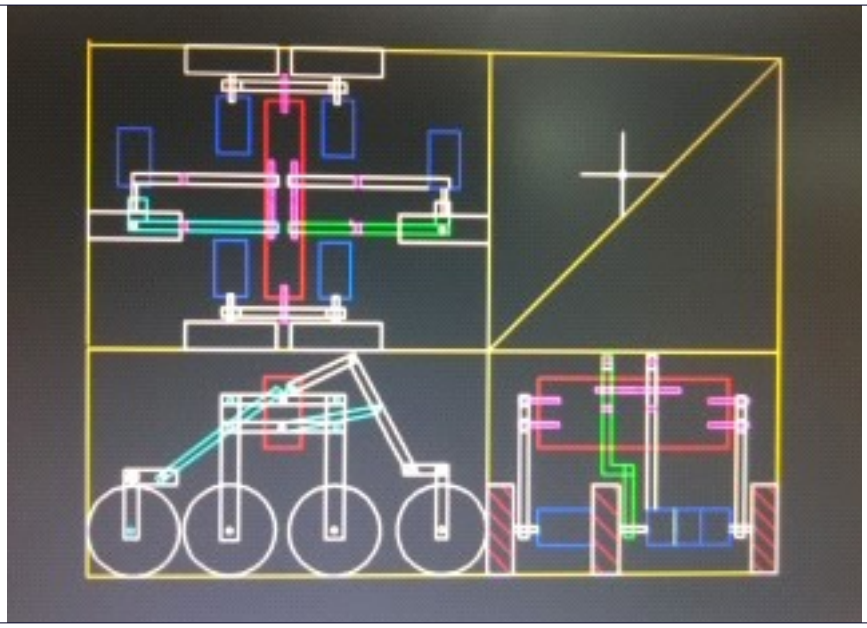


Figure 2: Movement decomposition for a step obstacle

PATH TO COMPlETION



We saw the video of working robot and were highly impressed by its functioning. Although the robot was simple in its design but required high accuracy and therefore we started with an auto cad design.After making autocad design we started with the boggies .We have used ball bearing at the hinges which allowed smooth motion and working of boggies.

Then we made the back wheels .

The body of the bot is made such that centre of mass is shifted towards the front wheel which increases the climbing capacity of the bot.

For front leg the free joint part was made and then springs were fitted for which supporting ends were made movable .

And the BOT IS COMPLETED AND TESTED .

VIDEOS OF COMPLETED PROJECT

1. *http://www.youtube.com/watch?v=elcB8CkcM-U*

2. *http://www.youtube.com/watch?v=SYD04uuf5Sc*

MATERIAL USED

Motor :- 12 V,60 rpm,37 kgcm torque

Wheels :- 9 cm diameter, 2 cm wide

Aluminium sheet :- 2 mm thick

Ball bearing :- 4 mm inner bore,13 mm outer diameter

Springs :- 2 of 6 cm

EXPENDITURE

ITEM	QTY.	COST
Motors	6	5400
Aluminium Sheet	8sqft	1000
Ball Bearings	32	1000
Tyres	6	600
Others		500
	TOTAL	8500

Team :-

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THANKS :-)