Stair Climbing Rover

WildWilly

VIEW IN BROWSER

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Summary

Rover was made specifically to do stair climbing. It is built on a rocker-bogie design, making this quite easy.

Hobby & Makers   >   RC & Robotics

Tags: thingiverse

My robot from the Danish DTU RoboCup competition. The rover was made specifically to solve the stair climbing obstacle. It is built on a rocker-bogie design, making the stair climbing quite easy. See the videos of the robot in the competition below.

It was inspired by the great design of this Martian Rover. It is however redrawn completely in order to make it possible to turn all wheels separately. Also, I wanted the motors to be inside the wheels, and all wires to be hidden inside the arms. The differential between the two main arms is inside the enclosure to keep the top free for future additions. The main frame has mounting holes all the way around making it easy to mount things inside the enclosure.

The design here is missing a few details, like the mount for the camera and a Raspberry Pi. I assume that if anyone want to make this, they will adopt these features for their own needs.

The robot is assembled mostly with M3 nuts and bolts. The arms are supported by a long M8 threaded rod. The top lid attaches with magnets. The fully assembled robot is about 430x330x220 mm (LxWxH).

- Motors: 25GA370 DC 6V Micro Gear Motor, 130RPM, 1:46.8
- Couplers: Chihai Motor 4 mm Rigid Flange Coupling
- Servos: TGY-R5180MG. An alternative is DS041MG which should fit, but requires a different gear. See this comment.
- Tires: BS701-002T (103 mm OD, 72 mm ID, 42 mm width). Alternatively @elpidiovaldez_18382 found that this or this can be used as a direct replacement. Look in the comments section for more details:

Note that the servos I used may be a bit under powered if used in rough terrain. On smooth surfaces they are sufficient.

For some accessories see this collection.

If you like this model, please consider also downloading it from Maker World. It will bring me a little close to to getting some free filament for future projects.

If you make remixes of this model and publicly shares the modifications, please consider uploading your changes in an editable format like STEP. It makes it so much easier for others to improve on your changes.

Printing

Look at the filenames to determine how many times you need to print each item.
1x_1xm_ means print one time as-is and one time mirrored.

The largest part is the frame. If it is too large for your printer, you can most likely print it by putting it on the side, and placing it diagonally on the bed. Also, cut it in two, like I did in the assembly video. That way it can be printed without support.

Outdoor TestAssembly InstructionsThe Rover in the Competition

First version going up the stairs:

Second version. Unfortunately the wooden floor was slippery, so the robot couldn't go up the stairs. Instead, it took a trip to the seesaw:

Model files

📁 **Step**   20 files

2x_arm_lower.step

1x_bottom.step

1x_large_bevel_gear.step

1x_1xm_pusher.step

1x_top_front.step

1x_top_back.step

12x_motor_mount.step

1x_1xm_top_arm_coupler.step

6x_motor_arm2.step

6x_rim.step

1x_1xm_top_arm_back.step

1x_frame.step

6x_motor_arm1.step

2x_end_stop.step

1x_differential_mount.step

1x_1xm_top_arm_front.step

1x_1xm_small_bevel_gear.step

6x_motor_mount_coupler.step

6x_gear.step

6x_gear_servo.step

1x_1xm_top_arm_front.stl

1x_1xm_top_arm_back.stl
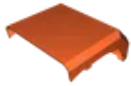
2x_arm_lower.stl

2x_end_stop.stl

1x_1xm_top_arm_coupler.stl

1x_frame.stl

1x_bottom.stl

1x_top_back.stl

1x_top_front.stl

6x_rim.stl

6x_motor_arm1.stl

6x_motor_arm2.stl

12x_motor_mount.stl

6x_motor_mount_coupler.stl

1x_1xm_small_bevel_gear.stl

1x_large_bevel_gear.stl

1x_differential_mount.stl

1x_1xm_pusher.stl

6x_gear_servo.stl

6x_gear.stl

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