robotex International

UPHILL MOUNTAINEERING RULES

COMPETITION COORDINATOR

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1 Introduction

This document defines the rules for the Robotex Uphill Mountaineering competition which is inspired by a long-standing robotics competition - Robot's Hill Climbing. The competition has a simple straight hill on which robots need to climb up. With every passing cm, the slope gets steeper. Different obstacles can also be placed on the track, which will add more challenge into the competition.

2 The field

1. The color of the filed is not determined.
2. The hill can have a white wall at the edge of the field, which is 12±3 cm tall. If there is no edge wall in the field, a black line will mark the edge on the floor. (Width 10 cm) Fields without an edge wall require a net under them to safely catch the robots.
3. The trajectory of the hill is straight. The slope becomes steeper with each passing distance on the hill. The hill can have a lower slope in its middle or at its highest point. Slope angle varies between 0-degrees to 70-degrees.
4. The width of the track varies between 40-100 cm.
5. The filed can have different obstacles.
    - Fixed walls, which are installed in a way that a robot who moves along the edges of the wall is not capable of passing the track. At the middle of the track, fixed walls can also be placed.
    - Loose materials, which can be installed at different parts of the field.
    - Holes that have a diameter of up to 4 cm and a depth of up to 4 cm.
    - Slippery zone, what robot can avoid. Zone borders are marked down with red lines. Color code: Red (CMYK: 0, 100, 100, 0 – RGB: 255, 0 , 0).
    - Grip zone for steep slope, what robot can avoid. Zone borders are marked down with red-black lines. (Appendix 1.) Color code: Red (CMYK: 0, 100, 100, 0 – RGB: 255, 0 , 0).

3 The robot

1. The robot must be autonomous.
2. In the starting position, the maximum dimensions of the robot are 40 x 20 cm (length x width), mass of up to 1 kg and 500 grams. (
3. The robot is not allowed:
   - to change its dimensions.
   - to damage the field and endanger the spectators.
   - to emit gases, liquids or dust.
4. The robot must have a start and stop button or a remote control (recommended).
5. EDF - Electric Ducted Fan or any other fan is allowed to be used in robot structures, but it is necessary to protect them safely to avoid harming either the operator or the referee. The robot's equipped fan can only be started on the steeper zones of the field. This zone starts and ends with a green line on the floor of the field. (Width 10 cm) Color codes: Green (CMYK: 100, 0, 100, 0 – RGB: 0, 255, 0).

4 The Competition

1. The competition is held in one age category.
2. It is allowed to have up to three members in a team.
3. **The winner is the robot that completes the track with the fastest time OR passes most sections of the track**.
   - Each fully passed section on the track gives 1 point. (The robot needs to fully cross the new section line to earn 1 point for that section. The sections are determined by the organizers and marked on the track or side of the track.)
   - If the robot completes fully the track, the robot earns maximum points and the time is recorded.
4. **Each robot has 5 minutes in the qualification attempts**. Teams can do as many rounds in that time as possible. The best result will be recorded after the attempt has ended.
5. At the beginning of the competition, robots are placed at the starting line, an attempt begins when the robot crosses the starting line.
6. Only one robot can be on the track at a time.
7. The competition consists of qualifications and finals.
8. **In qualification rounds each team has only 1 attempt**, they need to complete their attempt in the time given. (usually 2-4h, depending on the time schedule and number of competitors).
9. **The top 5 competitors will compete in the finals**.
10. **Each robot has 3 minutes in the finals.** Teams can do as many rounds in that time as possible. The best result will be recorded after the attempt has ended.

5 Organizing

1. The robot must be registered before the competition. The registration process includes technical inspection of the robot, marking the robot with a number sticker, and the order number will be drawn.
2. Technical inspection must be completed by the time that is specified by the organizers.
3. The current score is displayed next to the track.
4. All questions and problems arising during the competition are solved by the referee.
5. Protests can be submitted by the team member who was first registered. The final decision regarding any appeals is made by the referee and/or the organizers. All complaints must be reported to the referee during the match or right after the end of the match. Complaints filed later will not be accepted. The final decision regarding any disputes or inconsistencies is always made by the referee. **NB! Rude behaviour is not tolerated and the team who does not respect the referees / head referees decisions can be disqualified by the head referee and/or event organisers.**

NB! The arena has at parts uneven lighting and infrared noise, which may disrupt the work of sensors during the competition. For this reason, the organizers recommend using covers or blinds for sensors, testing the sensors under intense lighting conditions or even under direct sunlight to imitate the lighting conditions of the competition arena.

6 (Appendix 1.) Red-Black line

Figure 1. Red-black border.

7 Revision history

1. 27.05.2025 The rules are created