SUMO CHALLENGE: ROBORACE REGULATIONS

Roborace 31/10/2015

1. Foreword

Roborace category is something new on the polish scene of robotic tournaments. Despite the fact, that it is not widely known in our country, it is one of the most popular categories within our eastern neighbors. Although the idea of RoboRace is slightly similar to very popular Line Follower, thanks to simultaneous race of many robots the competition is far more unpredictable - accidents and collisions are very common. Since the shape of competition was borrowed from our colleagues from Technical University of Brest, most of rules in this paper base on solutions from Belarus. The same source applies for some of the figures used. Original version of the regulations can be found at:
http://raipap.bstu.by/index.php?page=roborace

2. Short description

Completely autonomous robots have to finish a certain amount of circuits from start till finish line, avoiding falling out of the track and collisions with other robots.

3. System of the competition

3.1) Competition is going to be performed in three phases:
- Qualification: Each robot has to finish one circuit.
- Elimination phase: each robot has to finish 10 circuits.
- Final phase: Each robot has to finish 20 circuits.

3.2) All robots registered for the tournament are obliged to take part in the qualification. They have to finish one, full circuit. During that, robot is not allowed to cause too much damage to the track. It is not allowed to hit track walls with the full speed. It is also not allowed to scratch the walls during the whole circuit. Short impacts on the walls, however, are allowed. Robot is supposed possess a system for by-passing co-competitors, however, due to the fact, that it is the first edition of Roborace in Poland, the system is not obligatory. Final verdict about "too much damage" caused to the track is issued by referees. Criteria of qualification can be less or more strict, depending on the number of competitors.

3.3) Robots, that succesfully finish the qualification, advance to elimination round. Then, five best robots advance to the final phase.

3.4) In the case of not enough robots, organizers have right to cancel the elimination and go straight to the final phase.

3.5) Organizers can decide to change the amount of circuits in each phase. Those changes can occur up to the start of the competition.

4. Definition of the track

4.1) Track is going to have area not bigger than 50m2. It is going to be white, divided lengthwise by black stripes. Edges of the track are going to be protected by vertical walls or height around 10 cm. Estimated shape of the track is visible in figure 1.

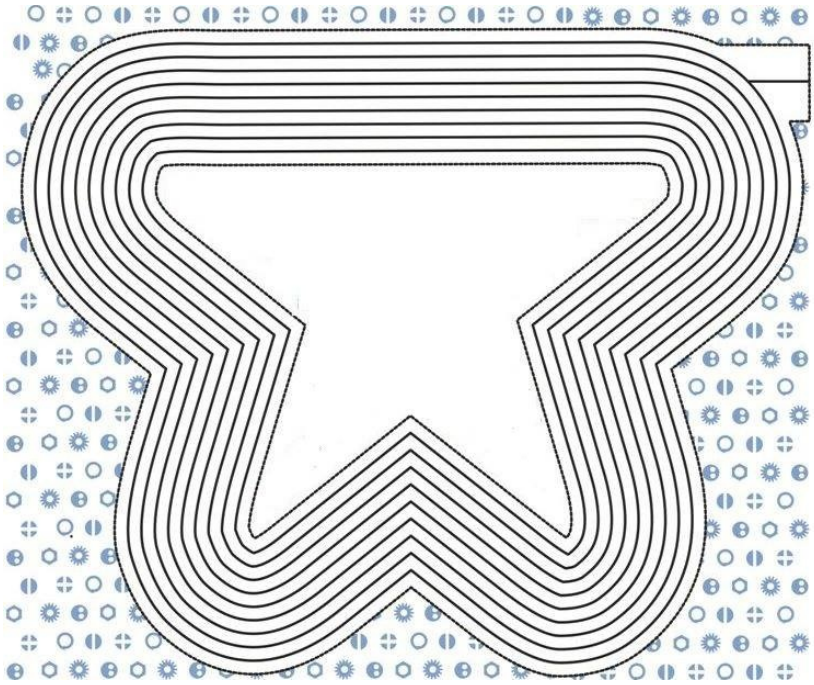

Figure 1 - Estimated shape of the track. Source- Technical University of Brest

4.2) There will be from 5 to 8 stripes on the track, each of width from 1.5cm to 2cm. White spaces between those stripes will have around 8 cm each.

4.3) Track will have clearly marked start line, that will be also the finish line. A robot, that manages to complete the whole way between two tracks will be granted with one circuit.

5. Positioning of the robots

In one race, there can be up to 6 robots. Robots are positioned basing on the results from qualification/elimination. Robots from odd places (1, 3, 5) will be placed at the inner edge. Robots from odd places will start closer to the outer wall. Schematic of that positioning is presented in figure 2.

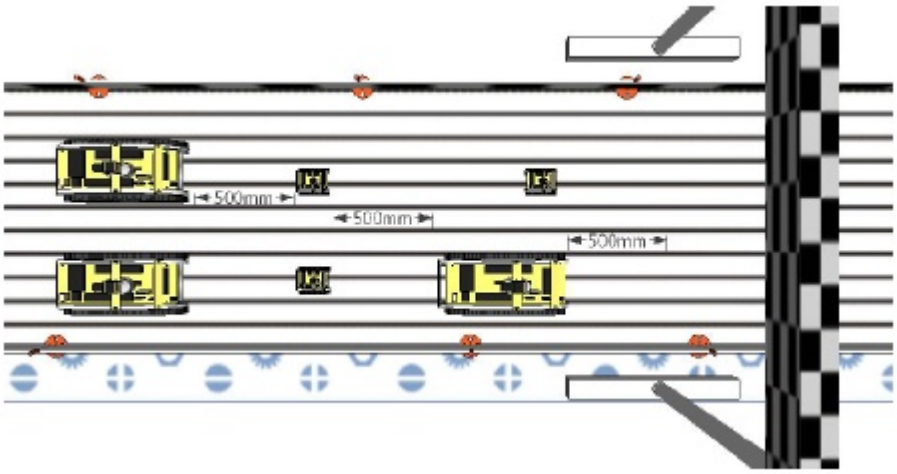

Figure 2- Positioning of the robots. Source - Technical University of Brest

6. Specification of the robot

6.1) Robot cannot exceed the following dimensions:
Max width - 250 mm
Max length - 500 mm
Weight of the robot should not be bigger than 3kg.

6.2) Minimal dimensions of the robot are not specified, however, constructors must take into account, that too small robot can be hard to notice by sensor, which might result in painful collision with a bigger colleague.

6.3) Robot can be powered from any source of energy, with an **exception** of those basing on a chemical reactions (like IC engines). In case of a plan of applying very unconventional source of energy, it is recommended to contact the organizers at least two days before the tournament starts.

6.4) Robot should fulfill basic rules of safety. All electronic components should be protected. Robot must not cause any danger for public around - it is strictly prohibited to use lasers stronger than class 1. In special cases, it is possible to use class 2 laser, but only, if it is not possible for the beam to leave the track.

6.5) It is strictly forbidden for robots to have any intended interference with other race participants. Robot is not allowed to pour any liquids on the tracks, or use any other cunning systems that could damage other robots. Referee has the final decision about safety of the robot.

6.6) In unfortunate case of robot falling out of the track it is possible, after acquiring acceptation of the referee, to continue the race. No matter in which part of the track robot has fallen out, it can only continue the race from the start line. Moment of placement and restart of the robot is chosen by the referee.

6.7) Robot has to be completely autonomous. It is not allowed to receive any external signals from laptops/telephones etc. Robots receiving those signals will be disqualified, without any chance of repeal.

6.8) During the race, any human intervention in the robot is strictly prohibited. Robot cannot be pushed, pulled, lifted, rotated etc. In case of a dangerous situation (robot stuck), team should contact with the referee, that might allow to manipulate the robot.

7. Final comments

It is allowed to register already assembled constructions that are available for sale, however, those robots will not be taken into account in the final results. If robot is a modified version of commercial construction, it is advised to contact the organizers in order to discuss possibility of participation. Constructions from sets, that are not dedicated for this kind of participations (like LEGO) can participate on normal conditions.

Tournament can be played in varying lighting conditions, therefore robotic sensors should be prepared for varying influence of light. It is prohibited for participants to move around the track in order to create shadow on a track.

Robot is considered as a inseparable unity - any element (excluding batteries) must not be used in any other robot.

Decision of the referee is final and there is no repeal from it. All causes not described in this paper are decided by the referee. Organizers have right to make small change in the regulations until the tournament starts.