ROBOFINIST

Arkanoid

RoboFinist competition rules

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1. General Provisions

The match is held between the two teams. One team plays one robot.

1.1. Task Description

The robot needs to kick the ball to the board behind the opponent using the video signal from the camera fixed above the field.

1.2. Restrictions

A team must meet the following requirements, unless otherwise specified by the Organizing Committee of a particular Event:

- the number of participants in the team is 2 or less (the number of coaches/team managers is not limited)
- the oldest member of the team is 22 years old or less in the year of the competition.

2. Requirements for the Robot

Requirements for the Robot:

- length - not more than 250 mm;
- width - not more than 250 mm;
- height - not more than 250 mm;
- weight - not more than 3 kg.

The robot may not exceed the specified dimensions, including at the extreme position of the kicking mechanism.

The robot's design must allow the robot to move only along the rail without touching other parts of the field.

The robot must be controlled by a remote computer via any wireless communication channel. Operator control is prohibited.

The robot must be equipped with a kicking mechanism that can roll the ball to the opponent's side.

The robot must contact the ball with the kicking mechanism only.

The robot must not be able to hold the ball in any way.

3.Specifications of the Field

3.1 Field

The field is a square-shaped playground limited by rigidly fixed boards (see Fig. 1). The field has a symmetrical transverse protuberance in the center. On the opposite sides of the field there are rails for robots moving.

Field Specifications:

- length - 1500 mm;
- width - 1500 mm;
- height of the boards - not less than 100 mm;
- wall thickness - not less than 10 mm;
- height of protuberance - 35+/-10 mm;
- shape of the longitudinal section of the protuberance is uniform curvilinear, with a smooth transition to the base of the field, optionally parabolic, elliptical;
- field color - white.

The rail is a square section rigidly fixed on the longitudinal boards of the field.

Rail Specifications:

- cross-section size - square with a side of 20 mm;
- height above the field - 100 mm;
- distance to the board of the field - 100 mm;
- material - metal;

Ball Specifications (optionally colored golf ball):

- color - red;
- diameter - 43 mm;
- weight - 46 g.

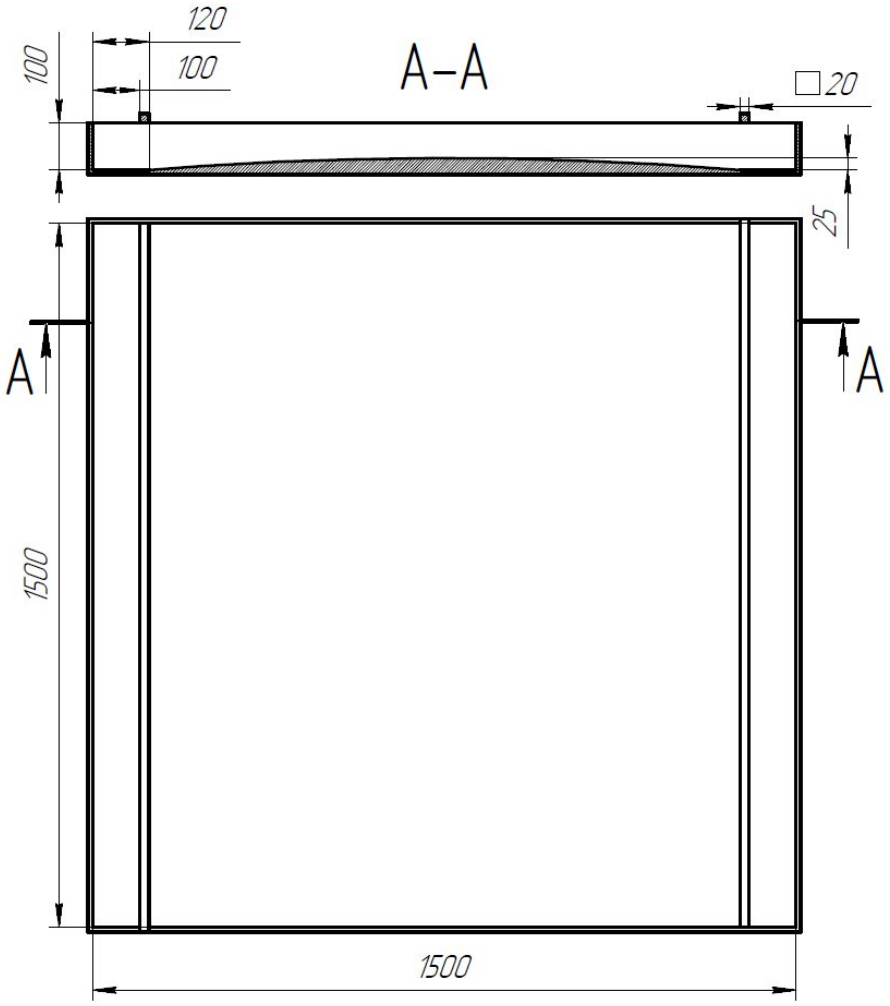

Figure 1. Field

3.2 Additional Equipment

Webcams:

- placement - on a beam mounted along the longitudinal axis of the field at a height of 2000+/-200 mm;
- viewing direction - vertically downwards;
- connection - via USB port to the participant's computer;
- camera field of view:
  - captures the entire field;
  - image of the field occupies not less than 80% on the short side of the frame.

If desired, the participant may additionally install his/her own digital camera, provided that it does not limit the view of the main cameras and does not interfere with the movement of the ball or robot.

4. Contest Procedure

Competitions are held according to the all-play-all, Olympic or match mixed system (see the «General Competition Rules»).

In case of failure to field a robot by the scheduled start time of the match, a team will be technically defeated 7:0.

4.1 Preparation

Before the match starts, the referee draws lots for the right to choose the side of the field to install the robot and the side to kick the ball into play. The winner of the toss may choose the ball entry side or the robot placement side in the first half.

In the second half, the robots change sides.

Operators place the robots on the rails. It is forbidden to unjoint the rails from the field.

The participants are given 3 minutes to install the robots and prepare for the match. By agreement of the teams, the preparation time can be reduced.

4.2 Match

The match consists of 2 halves.

Each half lasts 3 minutes, or until the score difference reaches 7 points.

In the Olympis system finals each half lasts 5 minutes.

The break between the halves lasts 3 minutes. By agreement of the teams, the break time can be reduced.

At the beginning of the half, the ball is kicked-off from the centre to the side determined by the draw, parallel to the side boards. Each subsequent kick-off is done similarly in the direction opposite to the direction of the previous kick-off.

A goal will be scored if the ball is completely behind the opposing board rail.

Dispossession occurs when the ball is stopped so that the robots cannot kick it towards the opponent.

The ball is kicked-off after each goal, dispossession or violation.

4.3. Technical Timeout

Once per match, each team operator may request a technical timeout.

A technical timeout is given to teams by the Juge when the ball is not in play.

The technical timeout lasts for 1 minute, during which the operators can make any manipulations with the robot or the control computer.

During the technical timeout, the half time stops and resumes from the moment the ball is kicked-off.

5. Violation and Disqualification

Violations punishable by awarding 1 point to the opponent:

- the robot touches the ball for longer than 2 consecutive seconds;
- the robot loses the ball in its own half of the field or the ball is not kicked to the opponent's side within 10 seconds after the robot has touched the ball.

In the following cases the robot will be disqualified:

- a team member touched the field, the robot or the control computer without the Juge's permission during the match;
- the robot is unable to continue the match for technical reasons (motor failure, low battery, failure of the kicking mechanism, robot overturned, robot does not react to ball movement, etc.) or at the operator's discretion, including the robot’s failure to kick the ball to the opponent's side.

In case of disqualification, the opponent's robot is awarded additional points in the amount necessary for the early end of the half with a difference of 7 points in favor of the opponent.

6. Scoring

The team is awarded 1 point for each goal.

7. Procedure for Determining the Winner

The robot with the highest score is declared the winner of the match.

If it is necessary to determine the winner of the match when the points are equal, the match time is extended until any of the opponents opens the lead.

The winner of the competition is the robot that took first place in the tournament.