RAS Soccer Rules

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This document

This document describes the rules for the Robotics and Autonomous Systems course 2D1426 at the Royal Institute of technology. They are based on the Robocup F180 league rules and adapted to this course by Mattias Bratt.

Latest version

The latest version of this document can be found on the course homepage. It is up to the teams to keep up with any changes/clarifications made to the rules. In case any such change/clarification is made a new version of this document will be posted on the course web site.

Revision history

Rev	Date	Spec
1.2	2007-03-31	Clarification on wheels, losing parts, start position, initialization and kicking device
1.1	2007-03-30	More rules about what is allowed to add in Section 1.8 no beacons or lights and clarification about wheels. Specified start point for unopposed scoring for seeding
1.0	2007-03-24	Reformatted the rules from year 2005 and 2006 and added some rules about what is allowed to add to the robot

Contents

Chapter 1

Construction

1.1 Safety

A robot must not have in its construction anything that is dangerous to it, other robots or humans. This means that the robot should be constructed so that it does not get stuck in the opponent easily. Anything sticking out from it, like a "bumper wire", has to be insulated so that it does not cause short circuits in the opponent.

1.2 Shape

A robot must fit in a 180 mm diameter vertical cylinder at all times, except for flexible parts that cannot stop the opponent or guide the ball. All such flexible parts must be above the height of the ball.

1.3 Robustness

All parts that were part of the robot when started are counted in the shape of the robot even if they fall of. If the robot loses some part and drives away from it, it will thus soon violate the Shape rule (see Section 1.2). A robot that loses parts has to be taken off for repairs together with the piece falling off. You do not have to put back the piece falling off if you do not want to.

All robots entering the competition have to comply with the Safety rule (see Section 1.1) and therefore, under normal circumstances, if something falls of a robot during a match it is considered to be the result of bad robustness.

1.4 Colours and markers

All robots must carry a colour marker in the form of a 4 cm high purple paper (will be handed out so that everyone has exactly the same type and colour) visible from all directions. When viewed from the side this colour marker must be at least 10cm wide from any angle. A 4cm high cylinder of diameter 10cm is one example of a marker that would fit the rules. The lower edge must be between 5 and 10 cm above the floor and it should be at the same height above the floor around the robot.

No other colours that can be confused with the ball, goals and field are allowed on the robots. The other teams decide what is confusing.

1.5 Locomotion

The robot must not harm the surface of the field when it moves. Keep this in mind when constructing sliding support points. Metal spikes, Velcro, and sand paper are specifically prohibited for the purpose of locomotion.

1.6 Communication

All forms of communication with the robot are forbidden, except when the robot is taken off the field for repair.

1.7 Kicking

Kicking devices are allowed provided all rules are followed at every stage of the kicking. Examples of rules to keep in mind are Safety (see Section 1.1), Shape (see Section 1.2), and Holding the ball (see Section 2.8). The kicking device must at all times during the kick obey the Shape rule.

1.8 Dribbling

Dribbling devices, which actively exert backspin on the ball, and which keep the ball in contact with the robot, are permitted under certain conditions. The force actively exerted on the ball must not be side ways. This means that vertical or partially vertical dribbling bars, known as side dribblers, are not permitted. "Screw-shaped" dribbler are not allowed either. Having two dribblers with a slight angle in between is allowed and so is having a dribbler that has a varying diameter. In all cases the robot must make sure not to violate the rule of not Holding the ball (see Section 2.8).

1.9 Adding your own components

It is allowed to add your own components to the robot but these must follow the rest of the rules dictated by this document (such as Safety (see Section 1.1), Shape (see Section 1.2), and Holding the ball (see Section 2.8)). Also remember that you are not allowed to keep the components handed out to you by the course.

1.9.1 Camera

No other or additional camera is allowed than the one provided to you by the course.

1.9.2 Motors

You are allowed to add your own motors but the drive wheels should be powered by the same type of motors provided to you by the course. You are not allowed to increase the voltage to the motors either.

1.9.3 Additional processors

Additional on-board processors are allowed. However, only 8-bit processors, such as a PIC, or less advanced are allowed. The eyebot is the only allowed main computer.

1.9.4 Wheels

You can make your own wheels but they need to have the same diameter as the standard wheels and use the same type of "o-rings" such that the contact with the field is the same. You are not allowed to have tracks or other types of skid-steering as that would destroy the field. You are only allowed to have one "o-ring" per wheel.

1.9.5 Beacons

You are not allowed to add beacons to assist the localization.

1.9.6 Lights

You are not allowed to add lights, lasers, etc to your robot unless all other groups agree to it as it might effect their cameras in a very negative way.

Chapter 2

The Game

2.1 Number of players

There is only one robot on each team.

2.2 The ball

The ball used in the game is red-orange golf ball. The minimum allowed diameter for a golf ball is 42.67mm.

2.3 The referee

Starts the game and repositions the ball to the centre point after each scored goal. He also moves the ball to an arbitrary neutral position in case of a deadlock during the game.

2.4 The duration of a match

A match will be three, four or five minutes long, for group play, semifinals and final respectively. There are no breaks.

2.5 The start of a game

When the game starts both robots must touch their own extended goal lines (anywhere along the short edge of the field out to the corners) with some solid part of their body. The ball is at the centre point. If both teams in a match prefer to play against the same goal, a coin is tossed to decide the matter.

The teams are not allowed to adjust the position of their robot based on the position of the opponent's robot. This mean that the teams should decide where to place the robots first and then place them on the field at the same time.

The robot is allowed to start calculations before the match has started, for example to initialize lookup tables. The time between putting the robot on the field the start of the match is typically not more than 30-60 seconds. After

the signal have been given to the robot that the game has started (pressed a button for example) the team cannot interfere with the robot unless for repair (see Section 2.7).

2.6 Scoring

A goal is scored whenever the entire ball is beyond the full width of the white goal line.

2.7 Repair

A robot may be taken off the field, e.g., for repairs, but must then stay off the field for a minimum of 30 seconds. This is the only case in which communication with the robot is permitted. After 30 seconds the robot may be put back into play at any time, in the defensive corner that is farthest from the ball.

2.8 Holding the ball

A robot is holding the ball if it takes full control of the ball by removing any of its degrees of freedom. This would be the case if for example a suction device prevented the ball from rolling when the robot moves.

Furthermore, at least 75% of the diameter (80% of the area) of the ball must be outside the convex hull of the robot when viewed from above. This means that at most 10.67mm of the ball (25% of 42.67mm) can be inside the convex hull of the robot.

A robot holding the ball will be sent off the field for 20 seconds. The robot should be replaced on the field in the same way as after a repair (see Section 2.7).

2.9 Kicking the ball into the air

A robot that kicks the ball more than five centimeters into the air is sent off for 20 seconds.

2.10 Improper defense of the goal

A robot may not cross full width of its own goal line with any solid part of its body. If it makes contact with the ball under such conditions a goal is awarded to the opponent.

2.11 Seeding

The competition starts with a seeding round where all robots get two minutes each to score as many goals as possible unopposed. An extra minute is allowed if a robot has not scored in two minutes, but if the robot still does not score it is excluded from the competition.

At the start and after scored goals the ball is put somewhere close to the centre line but not on the centre point as in a real game. The robot must not

# robots	Seeding# to groups	Semifinal
10	(1,4,10,5)(2,9,7)(3,8,6)	2+1+1
9	(1,7,6)(2,8,5)(3,9,4)	1+1+1
8	(1,8,4,5)(2,7,3,6)	2+2
7	(1,3,6,5)(2,7,4)	2+1
6	(1,6,4)(2,5,3)	2+2
5	(1,2,3,4,5)	4
4	(1,2,3,4)	4
3	(1,2,3)	2 (final)

Table 2.1: Rules for how the tournament is played with different number of robots. Column two shows how he seeding number tells what group a robot will play in. Group three shows how the semifinals are played.

be manually aimed at the ball and it should be placed close to the short wall (typically behind goal line) on the defensive side.

2.12 Passing the course

To pass the course, a team must be able to demonstrate unopposed scoring for several initial ball positions.

2.13 The tournament

2.13.1 Group play

The robots are divided into groups depending on their success in the seeding round (see Table 2.13.2). In group play, two points are awarded for a win, and one for a draw.

2.13.2 Finals

In the finals "golden goal" is used to settle a game on an equal result at full time (i.e. the game continues until one robot scores). If four robots from two or three different groups enter the semifinals they never meet a robot from their own group, and group winners meet robots placing second if possible. If three robots enter there is another round of group play in place of ordinary semifinals. In this case the golden goal rule is not used.