

Appendix 2

FIRA Androsot 3vs3 Game Rules

—semi-Automatic 3 vs 3 League—

Androsot is the newest type of Robot Soccer realized by Humanoid Robot. In Androsot competition of semi-Automatic 3 vs 3, there are two teams with 3 robots to compete. The operation mode is mixed with automatic control method based on camera vision and remote control based on wireless communication.

To realize the competition, the following condition must be taken:

1. Each team have 3 robots with wireless control.
2. At least one of the three players use automatic control method based on vision.
3. Only one computer to control.
4. There are only two or one camera outside the robot for each team's vision control. But, the number of the camera inside the robot will not limited.
5. There is only one player to control the robots.
6. Other information about the system refer to Appendix 1.

Law 1 :The robots

(a) Robot contour

1. The robots must be equipped with two arms and two legs.
2. The robot comply with the size restrictions of Appendix 2 ($20 \leq \text{height} \leq 40$).
3. The robot must be fully independent, with powering and motoring mechanisms self-contained.

(b)Control mode

1. Only wireless communication shall be allowed for all kinds of interactions between the host computer and a robot.
2. Available wireless communication modules are RF, Blue tooth and Zigbee. Other undisturbed modules should be prepared in case of influence disturb.

(c)Condition:

1. The robot must move within 30s after the beginning of competition.
2. The robot, which has two foots to walk, must have the ability of basic movement, such as move forward and turn.
3. The robot's legs must have the ability to stretch.
4. The robot's one leg must uplift when walking.
5. The robot must stand up all by itself when it fall down.
6. The robot, must observes the law 1(6), use wireless control mode.
7. The team, which is unqualified by check of size and motion, will not be allowed to carryey on the competition.

Law 2 : The Field ,the Ball and the Competition System

(a) Playground dimensions

1. A black (non-reflective) wooden rectangular playground 220cm X 180cm in size

2. The colour of the markings on the playground will all be white, and its width is 2cm.
3. 2.5cm thick and 5cm high white side-walls will be used. The topside of the side-walls shall be transparent plastic walls, the thick and height of which is 2.5cm and 10cm.
4. Solid 10cm X 10cm isosceles triangles shall be fixed at the four corners of the playground to avoid the ball getting cornered.
5. The surface texture of the board will be that of a ping pong table.
6. Markings on the playground refer to Appendix.
7. The goal, width and depth and height of which is 80cm and 40cm and 60cm, is make of transparent plastic to block the ball flying to the back.
8. The goal line and goal area:
The goal line is the white line which is 80cm long. It will be recognize as a goal when the ball cross the line.
The goal area(Appendix A) is a 90 X 15cm area in front of the goal line. In this area, anyone should not be here except the goalie.
9. The penalty area (Appendix B) is a 110 X 35cm area in front of the goal line. In this area, opposite party robot should not be here.
10. The playground is indoor.

(b) The ball

1. A orange tennis shall be used as the ball, with 6.4cm diameter and 56g weight.
2. Using the ball of ITF(international tennis federation)

(c) The competition system

1. There is only one person to operate the robot by only one way of using computer with wireless communication system.
2. Each team can use only two or less cameras, the height of which is 2.5m, and should not affect opposite team's cameras.
3. The robots can use embedded vision control. At this time, embedded computer can be used to perform vision operation.
4. In one team, there should be one or more robots use control method based on vision.
5. The lighting condition in the competition site shall be fixed around 1,000 Lux.

Law 3 : The rule of competition

(a) Game Duration

1. The duration of a game shall be two equal periods of 7 minutes each, with a half time interval for 5 minutes.
2. In the competition process, when it stop for a robot exchange, the substitution should be cut off from the game duration.
3. If there is no winner when the game duration is over, taking a break. Then, competing for 3 minutes in the overtime period.
4. In the overtime period, by the rule of Golden Ball, the winner is the team that goal first.
5. If the score of the two team is still the same after the overtime period, performing the spot kick form No.1 robot in turn to have the winner.

6. The rule of spot kick refer to rule 5-b. shooting robot can kick only once.

(b) Game start:

1. Decide the active team by throwing coin.
2. The active team firstly selects the goal.
3. The robots will be placed freely at own half playground, and the goalie must be placed at the goal area.
4. The ball must be placed at the center position when goal or a half time. The active team must kick the ball to own side half playground. And the position of robots refer to Law 3.b-3.
5. To exchange the half playground when a half time is over.

Law 4 : Method of Scoring

(a) The winner

1. A goal shall be scored when the whold of the ball passes over the goal line.
2. The winner of a game shall be decided on the basis of the number of goals scored.
3. if the discrepancy number of goals scored exceed 10 when a half time is over, the game is over.

(b) The tiebreaker

In the event of a tie after the second half, the winner will be decided by the Law 2(a3~a5).

Law 5 : Fouls

(a) Free Kick

1. Condition:

- A defender robot intentionally pushes an opponent robot, a free kick will be given to the opposite team.
- Enter into opposite penalty area (B area in Appendix 3).
- The robot touches the ball by hand during the game, but the goalie may touch the ball at the own penalty area.
- The robot moves before the referee whistles during game (refer to Law 6.2).

2. process:

- All the robot must stop when the referee give Free Kick.
- The defender robots can not enter into the area (radius is 20cm) around the Free Kick positon).
- The active robots may kick the ball at the Free Kick position after the referee whistl e. The defender robots can not move before the active robots kick the ball, otherwise, the active robots restart Free Kick.
- If the active robots do not kick the ball when 10 seconds pass after the referee's whistle, the defender robots get the Free Kick.

(b) Penalty Kick

1. Condition:

- Failure on the part of a goalkeeper to kick out the ball from its goal area within 10 seconds.
- The defender robots push the shooting robot down.
- The length the goalie touch the ground exceeds 30cm.
- Defending with more than one robot in a goal area.
- Three robots of one team stay inside their own penalty area.

2. process:

- The ball will be placed at the Penalty Kick position on the playground.
- The defender goalie will be placed at the goal area (A area in Appendix3), and other robots can not be placed at the goal area.
- The active robots may kick the ball at the Penalty Kick position after the referee whistle.

Law 6 : Free Ball

1. Condition:

- Referee will call a free-ball when a stalemate occurs for 10 seconds at the corner.
- Referee will call a free-ball when a stalemate occurs for 10 seconds outside the goal area.

2. process:

- When a free-ball is called within any quarter of the playground, the ball will be placed at the relevant free ball position (FB) (Appendix 3).
- Other robots can be placed freely outside the area(radius is 30cm) around the Free B all position.
- The robots move after the referee whistle.
- The robot of one team moves before the referee whistles,and a Free Kick is awarded to another team.

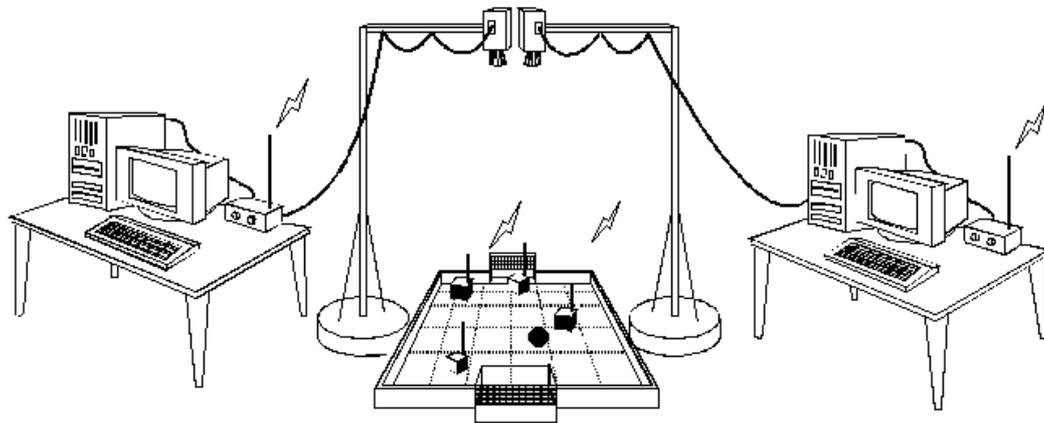
Law 7 : Goalie

1. The goalia may catch the ball at the Penalty Area(B area in Appendix 2), but if the goalie catch the ball outside the Penalty Area, a Free Kick is awarded to another team (Law 5.a).
2. if the length the goalie touch the ground exceeds 30cm, a Penalty Kick is awarded to another team.
3. If the goalie do not kick out the ball from its goal area within 10 seconds, a Penalty Kick is awarded to another team(Law 5.b).

[Appendix 2]

Appendix 2

Overall system



A: Goal Area

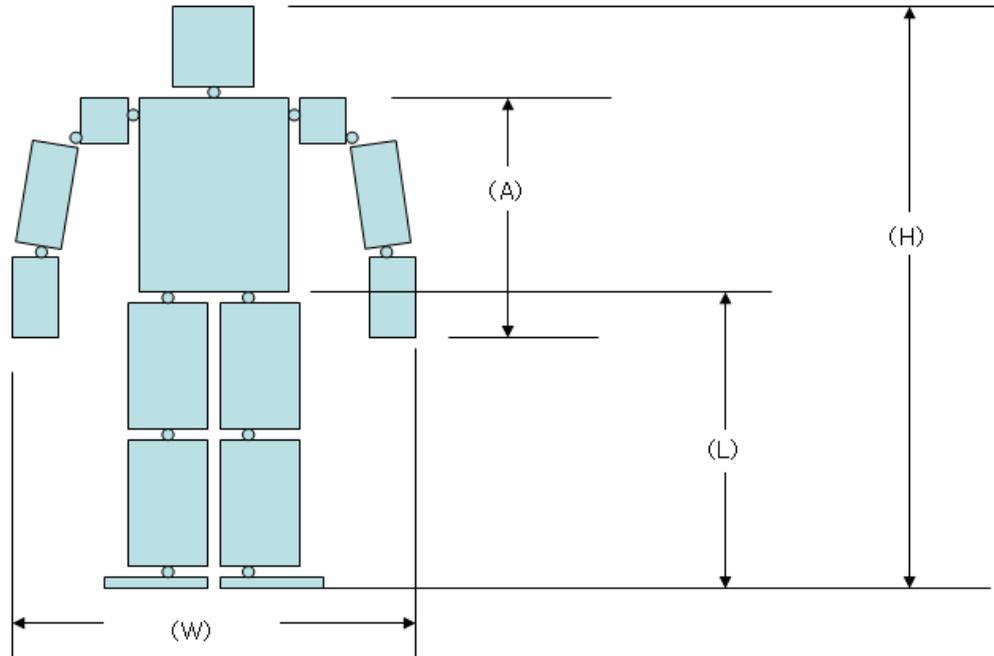
B: Penalty Area

C, E: Free Ball Robot Point

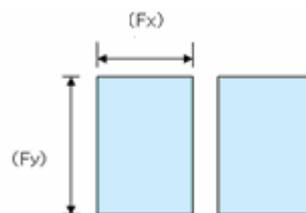
D: Free Ball Point

F: Penalty Ball Point

[Appendix 3]



1. The robots must be a equipped with two arms and two legs humanoid robot
2. The weight of the robot is no limited.
3. The height of the robot is from 20cm to 40cm.
4. The width of the robot should not be larger than the height. The width and the height is when the robot stand up.
5. The length of the robot's arm should not longer than the leg.
6. The intercrossing sole is not allowed.



7. The lateral and vertical length of the robot's foot is smaller than the half length of the leg.
8. The accessory of the robot(wireless module, sensor, camera, controller, antenna) should be all inside the robot's body.