

## **Laws of the Game**

### **RoboCup Humanoid Open Competition Rules (Small Size) – DRAFT**

*The games in the RoboCup Humanoid Open Competition (HOC) are played as drop-in<sup>1</sup> games for bipedal robots, with a minimal rule set. Every participating individual or group contributes a single robotic player to a robot team. Scoring is according to the HL drop-in rules. Individuals may participate in the HOC for a maximum of three years only and must not have participated in the regular humanoid league before.*

#### **1. Field of Play**

*The HOC is played on the fields of the RoboCup Humanoid League<sup>2</sup>. Yellow, respectively blue cardboard figures represent the goal keepers. They are suspended from the respective goals cross bars, reaching the floor. Both figures have the same form. They are positioned by the referee, who may change their position during any stoppage of the game.*

#### **2. The Ball**

*The ball is a FIFA size 1 ball with at least 50% colored surface with a color that is not used otherwise in the field (e.g. orange).*

#### **3. The Number of Players**

*The teams consist of 3 – 6 randomly chosen robots and change during the tournament.*

#### **4. The Players (Small size)**

*The robot players are bipedal autonomous robots that walk on two legs and drive a ball by pushing or kicking. The maximum size of the robots is 1 meter, the maximum weight is 10 kg. Robots may be started manually at the touch line of their team's own half. Robots that are started by the game controller<sup>3</sup> may be positioned anywhere in their own half. After positioning and possibly starting the robots, human team members must not interfere with the game play, except if explicitly called for by the referee. Robots need to be equipped with a handle to be safely picked up by a referee and an emergency switch off that is clearly marked and reachable.*

#### **5. The Referee**

*Each match is controlled by a team of referees with one head referee, who has full authority to enforce the Laws of the Game.*

#### **6. The Duration of the Match**

*A match is played in two half times of 10 minutes each with a break of 5 minutes.*

#### **7. Start and Restart of Play**

*The play is started and restarted by a drop ball at the kick-off point at the center. The ball is in play for both teams immediately. Goals may be scored immediately.*

*A game is restarted for:*

- *second half time,*
- *after a goal was scored,*
- *after half of the robots of a team became inactive or removed (for whatever reason),*
- *stuck game.*

*For start and restart of game robots may be placed and possibly manually started by the respective robot handler. Pick-up of robots by robot handler only is allowed during stoppage of the game.*

#### **8. The Ball In and Out of Play**

*If the ball leaves the field of play, it is returned to field by the referee or an assistant referee, one meter into the field. There is no stoppage of the game.*

#### **9. The Method of Scoring**

*A goal is scored if the ball completely crossed the goal line between the two goal posts.*

#### **10. Fouls and Misconducts**

*The following cases are considered as fouls, resulting in a 60 seconds removal penalty:*

- *any action posing the potential to significantly damaging a robot, including itself,*
- *leaving the playing field (field of play and surrounding green surface),*
- *any other significant offence, e.g. obstructing the game, as considered by the referee.*

*Robots potentially endangering humans by whatever activity are excluded from the game (red card).*

## ***RoboCup Humanoid Open Competition Rules (Large Size) – DRAFT***

*same as above, except for*

### ***4. The Players (large size)***

*The robot players are bipedal autonomous robots that walk on two legs and drive a ball by pushing or kicking. The size-range of the robots is 1 – 2 meters, the maximum weight is 100 kg. Robots may be started manually at the touch line of their team's own half. Robots that are started by the game controller may be positioned anywhere in their own half. After positioning and possibly starting the robots, human team members must not interfere with the game play, except if explicitly called for by the referee. Robots need to be equipped with a remotely controlled and an on-robot emergency switch off that is clearly marked and reachable.*

## From the Humanoid League Laws of the Game

### 1) Scoring in Drop-In Games

When a goal is scored, all players of the scoring team on the field receive 1 point and the player who scored the goal receives an additional 1 point if it was not an own goal. A robot is considered to be on the field if both feet of the robot are fully inside the field area. The player who scored the goal receives the points regardless of its position on the field. Incapable players, penalized players, players outside the field or players having been removed for any other reason, e.g. service, will receive no point. When a goal is suffered, all players of the team suffering the goal receive -1 points, including incapable players, penalized players or players having been removed for any other reason, e.g. in service. Points from all games are summed up. For players who played one or more games more than the others, only the points of those games with the higher scores are considered.

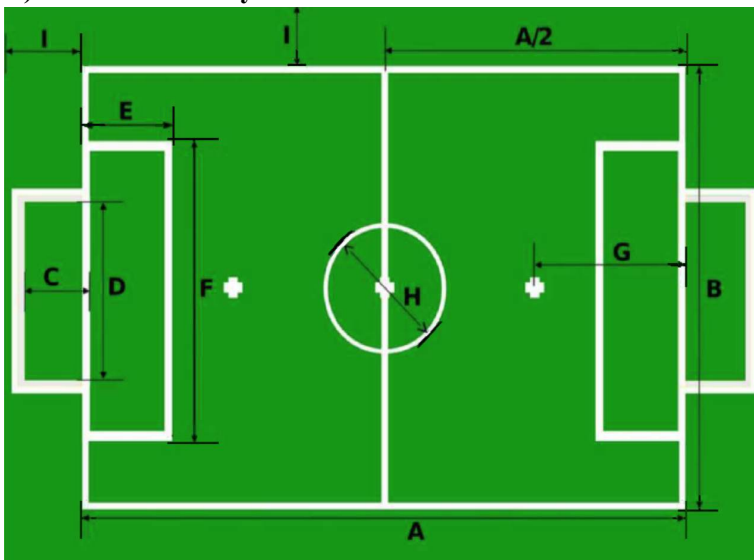
Drop-in players are initially ranked according to the accumulated points. If there are ties, the tied players are ranked according to the arithmetic mean, the number of games played, the maximum points awarded in a single game and the number of goals scored (in this order). The three most highly ranked players of a sub-league receive a 'Best Player' certificate.

If the three best drop-in players can not be identified with the scheme provided above, an additional game with players drawn group wise (from the groups of equally high ranked players with a total number of points greater than zero) from the highest-ranked players is to be played. If there are still ties a penalty shoot out among the equally high ranked drop-in players with a total number of points greater than zero takes place.

#### Example

There are 20 participating players for 4 KidSize Drop-In teams (A, B, C, D). Games shall be A-B, A-C, A-D, B-C, B-D, C-D. For the first game (A-B), Player 1 is randomly drawn for Team B and plays the game with the other team members. For the second game (A-C), player 1 is not drawn. For the third game (A-D), player 1 is drawn for team A and plays the game. For the fourth game (B-C), player 1 is drawn to team C and plays the game. Now player 1 will be removed from the drawing, because the number of 3 games was reached. If there would be only 19 participants, player 1 may be drawn for the final game. Assuming teams with player 1 to score a single goal in every game (with player 1 on the field), then player 1 will have a score of 3 and an arithmetic average of 1.

### 2) The Field of Play



A	Field length	9m
B	Field width	6 m
C	Goal depth	0.6 m
D	Goal width	2.6 m
	Goal height	1.8 m
E	Goal area length	1 m
F	Goal area width	5 m
G	Penalty mark distance	1.5 m
H	Center circle diameter	1.5 m
I	Border strip width (min.)	0.7 m

### 3) Game Controller

The source code of the game controller/referee box is available from <https://github.com/RoboCup-Humanoid-TC/GameController>, see also <https://www.robocuphumanoid.org>.