



HUMANOID SUMO

Update: 31/7/2026

AGE CATEGORY

SENIOR & ADULTS (15+)

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1. Definition of the Sumo Match

A match is fought between two teams, each team having two or three members. Only two team members from each team may approach the ring; The operator and the assistant will enter the game area, the other team members must watch from the audience. In accordance with the game rules (hereafter referred to as "these rules") each team competes on a Dohyo (sumo ring) with a robot that they have constructed themselves to the specifications in Section 2.

The match starts at the judge's command. The judge determines the winner of the match. After the match the operator and the assistant will go to the rooms designate for the challenge and wait for the next game.

2. Requirements for Robots

2.1. General Robot Specifications

- A. Any robot design is allowed, if is not subject to the limitations of section 2.2.
- B. A robot must fit within a square with the side length of 20 cm (200 mm). Maximum height for the robot 50 cm (500 mm).
- C. The total mass of a robot at the start of a match must be under 3kg (3000g).
- D. The robot must be a two legged walking humanoid biped that must shift its center of gravity to maintain its balance when walking.
- E. All robots must be autonomous. Any control mechanisms can be employed, as long as all components are contained within the robot and the mechanism does not interact with an external control system (human, machine, or otherwise)
- F. The robots must have displayed a number, offered by the organizers, on the casing of the robot in a visible place for the referee.

2.2. Robot Restrictions

- A. When walking, one foot must lift off the floor, while the other foot is balancing the robot.
- B. When walking, the foot that balances the robot must have a knee-joint angle greater than 90 degrees. At any point if this is not the case, the robot will not be considered walking.
- C. The feet can be of any shape and form as long as all of the following are maintained:

a. The robot's foot is defined as the part of the robot that is contacting the surface of the arena (ground).

b. The maximum length (size) of the foot must be less than 50% of the length of the extended robot's leg. The leg length is defined as the distance between where the robot's foot touches the ground and the axis that connects the leg to the upper body of the robot.

c. The maximum length of the foot must be less than 20 cm (200 mm).

D. When robot is standing or walking, a rectangular outline around the left and right feet shall not overlap.

E. The robot must have 2 arms. Each arm extended length shall not exceed the extended leg length.

F. The robot must have a head.

G. Jamming devices, such as IR LEDs intended to saturate the opponents IR sensors, are not allowed.

H. Parts that could break or damage the ring are not allowed. Do not use parts that are intended to damage the opponent's robot or its operator. Normal pushes and bangs are not considered intent to damage.

I. Devices that can store liquid, powder, gas or other substances for throwing at the opponent are not allowed.

J. Any flaming devices are not allowed.

K. Devices that throw things at your opponent are not allowed.

L. Sticky substances to improve traction are not allowed.

M. The robot must stand still for 5 seconds before the start of the match. After 5 seconds the robot can move.

N. The robot can be started from a remote or from a button placed on the robot.

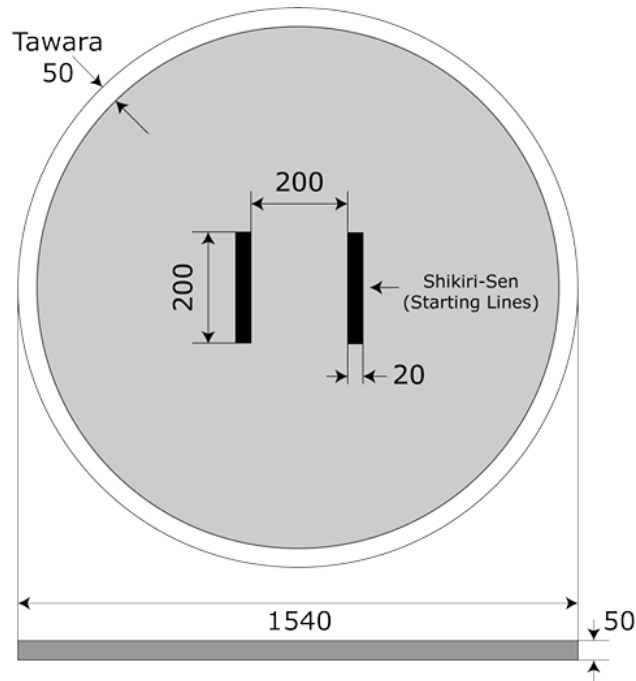
O. The robot can't be started using a laptop with a connected cable.

3. Requirements for the Dohyo (Sumo Ring)

3.1. Dohyo Interior

The dohyo interior is defined as the playing surface surrounded by and including the border line. Anywhere outside this area is called the dohyo exterior.

3.2. Dohyo Specifications



Characteristic	Specification
Diameter	154 cm (1540 mm)
Material	Circular, made of wood, 5 mm thick
Color	Black
Boundary Line	White circular ring, 5 cm (50 mm) wide
Dohyo Base	Wooden surface, 5 cm (50 mm) high
Dimensional Tolerance	±5% for all dohyo dimensions

- ✓ In the center of the arena, an "H or X" is placed to mark the robot placement area for the player.
- **Inner Dohyo:** The playing surface, including the boundary line.

- **Outer Dohyo:** The area outside the boundary line.
- **Dohyo Area:** The space around the ring. There must be adequate space outside the outer edge of the dohyo.

3.3. Doyho Exterior

There should be a space appropriate for the given class outside the outer edge of the ring. This space can be of any color, and can be of any material or shape as long as the basic concepts of these rules are not violated. This area, with the ring in the middle, is to be called the "ring area".

3.4. How to Carry Sumo Matches

A. One match shall consist of rounds, within a total time of 2 minutes, unless extended by the judges. The extended match won't exceed 1 minute.

B. When the match is not won by either team within the time limit, an extended match may be fought, during which the team who receives the first "Yuhkoh" point shall win. Alternatively, the winner/loser of the match may be decided by judges, by means of lots, or by a rematch.

C. If the robots get stuck, the rules from the point 6.1 will be applied.

D. If one of the two robots won't start, a restart will be done. If at this restart the same robot won't start, the match will be won by the robot that moves.

3.5. Course of the Competition

Important!!! One person can be operator for maximum 2 robots !!!

A. The robots will be divided into groups according to the number of participants. The competition will take place in a groups/quarters/semifinals/finals system in order to allow as many rounds of play for each robot. The decisions of the refs must be unanimous and are final; questioning these decisions leads to disqualification.

B. If two robots of the same team will advance to quarters/semifinals/finals and play one against the other, they must play the match, without demanding that one of them to advance without play, or to demand to arrange the matches or the opponents.

C. The order of the robots in the groups will be made random, it will be made after the official opening of the competition, will be available on the website for all the participants. The ones that pass the groups will play quarter/semifinals/finals.

If the number of the participants will not be enough for the groups the competition will be played from the beginning using the pyramidal system. The position in the pyramid will be random.

D. During the whole contest, a team has the right at 2 reprogramming interruptions, 5 minute each. Other breaks are allowed only for mechanical problems and only with referee's approval. This rule is applied only during a running match. Besides the matches, the changes and reprogramming are allowed. The teams are required to be at the start in maximum 1 minute from the request, otherwise they will lose the match.

E. Until the Technical control, all the teams will stay in the room reserved for them (the room will be marked in the area map from the team's folder). Each challenge will have a room. The teams can leave the room only when they are called to the competition area. Each team will be called by a competition official, when they need to go to the waiting area which is near the competition area.

F. After the Technical control the teams, which will follow at start, will remain at the competition area, in the waiting area. The teams will leave this area only if the referee agrees, or only for repairs and they must return in the time set by the referee. If the team doesn't return at the first call, they will lose the match.

G. After a match is over, the teams must return in the room reserved for them.

H. Each team has the responsibility to follow the starting grid (schedule), displayed on the website and in the team's room. PLEASE DON'T BE LATE, WE WILL NOT WAIT!!!

If you are called to play and you don't come in 5 minutes the robot is disqualified !!!

I. Each team will have one operator and one assistant. Only the operator and the assistant are allowed in the waiting area or game area. The rest of the team will remain in the room or will follow the game from the audience.

3.6. Inspection

Each team will have to pass the inspection stage, in order to participate with their robots in the competition.

The stages of Technical control process are:

A. Checking the robot dimensions by placing a 20.3 cm x 20.3 cm (203mm x 203mm) box/frame, bottomless, over the robot. The height of the robot will be measured maximum 50.3 cm (503 mm)

B. Weighing the robot on a digital scale. The maximum value must be 3005g.

C. The 5 second delay will be checked.

D. It will be check if the operator and assistant have the protective gear.

E. It will be checked if the number exists on the outer casing of the robot.

The robot will not be restrained after Technical control.

After inspection the first 4 teams will remain in the waiting area, near the game area. The rest of the teams will return to the room assigned for them.

4.Start, Stop, Resume, End a Match

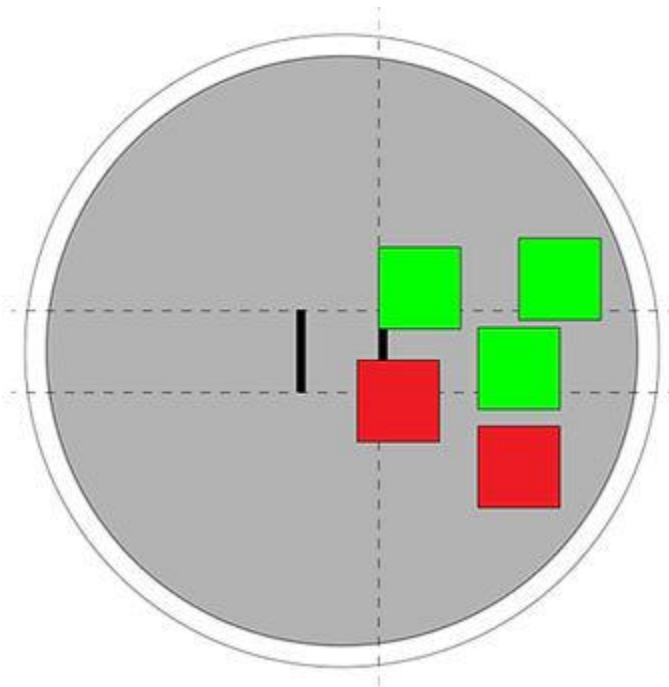
4.1. Robot Placing

Upon the judge's instructions, the two teams approach the ring to place their robots on the ring. The operators will place the robots in the same time on the ring. The Judge will give the signal. After placing, the robots may not be moved anymore. After placing the robot on the ring, the operator and/or the assistant must retreat to the marked safe area.

Any part of the robots must be placed behind the «X». The robot shall not go over the starting line toward the oponent.

The robot should be placed on and within the extended lines vertically from the both edges of Shikiri-Sen (starting line)

The referee will check if the robots are places ok. If the placement is not corect, the robot positioning will be made again.



4.2. Start

The match starts at the referee command. At the start command the operators will start the robots, which must move after a 5 seconds delay.

The start will be made after the operator and/or the assistant will be in the safe area. If the operator and/or the assistant will leave the safe without referee approval the team can lose a point or can be disqualified.

4.3. Stop, Resume

The match stops and resumes when a judge announces so.

The judge announces the moment when the robots can be placed on the ring, the moment when the operator and/or the assistant to retreat in the safe area and the moment when they can take the robots from the ring.

4.4. End

The match ends when the judge announces so. The two teams retrieve the robots from the ring area.

After the robots are retrieved the decision is final and no objections shall be declared.

5. Time of Match

5.1. Duration

One Match will be fought for a total of 4 minutes, starting and ending upon the judge's command, after the operator and assistant will retreat to the safe area.

5.2. Extention

An extended match, if called for by the judge, shall last for a maximum of 1 minute

6. Scoring

A. Knockdown

- a. A knowckdown accours when a robot is knocked down by its opponent.
- b. 2 points shall be added to the opponents score.

B. Slipdown

a. A slipdown occurs when a robot falls on its own.

b. 1 point shall be added to the opponents score.

C. Ringout

a. A ringout occurs when any part of a robot contacts the surface outside the arena.

b. 3 points shall be added to the opponents score.

c. The team of the robot shall be given permission by the judge to place their robot face down within the arena without further penalty provided it can get up within a 10 second countdown.

D. Knockout

a. A knockout occurs when a robot fails to get up within a 10 second countdown.

b. A knockout occurs when a robot is unable to move or walk when commanded by a judge within a 10 second countdown.

c. When a knockout has been declared the match is immediately ended, and the match shall be awarded to the opponent.

E. All the points will totaled for opponents for each round.

F. The match may be stopped by the judge if the robots do not touch each other for more than 15 seconds and no clear will to fight is observable.

G. Determining the Winner

a. The robot with the most points will be determined the winner of the match.

b. In eventuality of a Knockout

c. In the event of a tie in the final score, the judge will vote for the winner based upon tactics, aggressiveness and activity.

d. If none of the robots scored a point, the judge may decide that there is no winner of the match.

6.1. The match shall be stopped and a rematch started under the following conditions:

A. If one of the two robots doesn't start there will be one restart.

If at restart the same robot doesn't start, the point will be won by the robot that moves.

B. The robots are entangled or orbiting each other with no perceivable progress for 10 seconds there will be one restart.

If at restart the situation is repeating, the winner will be the robot that moves more and shows the willing to fight.

If at restart the situation is repeating, the robot that moves faster and attack more will be the winner of the round.

C. Both robots move, without making progress, or stop (at the exact same time) and stay stopped for 5 seconds without touching each other.

However, if one robot stops its movement first, after 5 seconds it will be declared as not having the will to fight. In this case the opponent shall receive a “Yuhkoh” point, even if the opponent also stops. If both robots are moving and it isn't clear if progress is being made or not, the judge can extend the time limit up to 30 seconds.

D. If both robots touch the outside of the ring at about the same time, and it can not be determined which touched first, a rematch is called.

Important:

In the case the winner can't be declared in any of the above situations, there will be a special rule:

A bottle will be placed in the center of the Dohyo and the first robots that touches it is declared the winner.

6.2. Repairs, modifications, unpredicted interruptions

If a robot gets broken during a match, the main referee will assign a repair within 1 minute. This range can be extended up to 5 minutes the organizers. The repairs will be supervised by an assistant referee, to avoid changing the robot modules with other unapproved ones.

If a robot can not be repaired within the range specified, the match is won by the opponent robot, but the broken robot team can continue repairs until the next match involved, in this case being supervised by a referee / member of the organizing committee.

Replace defective parts can be made and the batteries can be recharged during the competition, if necessary.

If there any modification made to the robot after homologation, the robot must pass again the homologation stage.

7. Violations

7.1. Violations

Players performing any of the deeds described in Sections 2.2, 7.2 or 7.3 shall be declared in violation of these rules.

7.2. Insults

A player who utters insulting words to the opponent or to the judges or puts voice devices in a robot to utter insulting words or writes insulting words on the body of a robot, or performs any insulting action, is in violation of these rules.

7.3. Protective gear and the safe area

It is considered serious misconduct in regulation:

A. The operator and/or the assistant doesn't retreat to the safe area or they don't comply the indications of the referee.

7.4. Minor Violations

A minor violation is punishable with a warning and is declared when:

A. The competitor enter the ring during the match , unless the referee stops the match after the grant of a "Yuhkoh " point and the contestant goes to pick up the robot. To enter into the ring means:

- a. A part of the player's body is in the ring.
- b. A player puts any mechanical kits into the ring to support his/her body.

B. Performs the following deeds:

- a. Demand to stop the match without appropriate reasons.
- b. Take more than 60 seconds before resuming the match, unless the judge announces a time extension.
- c. Take action of any kind which are contrary to the spirit of fair-play of the game.
- d. The operator and/or the assistant will leave the waiting area without announcing the official of the competition or the referee regarding the reason of leaving.

If a team has 2 warnings, a "Yuhkoh" point will be given to the opposite team, or the team can be disqualified depending of the gravity of the action that they did.

8. Penalties

8.1. Penalties

- A.** Players who violate these rules by performing the deeds described in Sections 2.2, 7.2 and 7.3 shall lose the match. The judge shall give two “Yuhkoh” points to the opponent and order the violator to clear out. The violator is not honored with any rights.
- B.** Each occasion of the violations described in Sections 7.4 shall be accumulated. Two of these violations shall give one Yuhkoh to the opponent.
- C.** The violations described in Article 7.4 shall be accumulated throughout one match.
- D.** If one robot starts before the 5 seconds delay, 1 point goes to the opponent.

9. Declaring Objections

9.1. Declaring Objections

- A.** No objections shall be declared against the judges' decisions.
- B.** The operator of a team can present objections to the Committee, before the match is over, if there are any doubts in the exercising of these rules. If there are no Committee members present, the objection can be presented to the judge before the match is over.

10. Flexibility of Rules

As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and of the contents of matches. Modifications or abolition of the rules can be made by the local event organizers as long as they are published prior to the event, and are consistently maintained throughout the event.

11. Liability

- A.** Participating teams are always responsible for their own safety and for the safety of their robots and are liable for any accidents caused by their team members or their robots.
- B.** The RoboChallenge organization and the organizing team members will never be held responsible nor liable for any incidents and / or accidents caused by participating teams or their equipment.