

SumoBot Competition Rules¹

Milwaukee School of Engineering

Robot Specifications and Requirements

- Robot Weight Range: 0 to 1.5 lbs
- Robot Dimensions: 6 inches long by 6 inches wide, any height
- Arena Specifications: 36 in diameter ring, white edge, red-brown start lines
- Robot Control Specifications: autonomous
- Power Specifications: Must operate on 5 (or fewer) standard AA batteries. May not generate any voltage greater than that supplied by the batteries. No other power sources may be used.
- Components: May use only the electrical and electro-mechanical components contained in the EE1910, EE2920 and EE2930 parts kits. Any additions or substitutions must be approved by course instructors in advance of the competition.

Competition Rules²

Section 1. Definition of the Sumo Match

Article 1. (Definition) The match shall be fought by two teams (At the event, one team consists of one robot with one team member, according to these Rules for Sumo matches (hereafter called "these Rules"), with each team's robot made by each team competing to get the effective points (hereafter called Yuhkoh), within the perimeter of the defined Sumo Ring. The judges will decide which team wins.

Section 2. Requirements for Ring Area

Article 2. (Definition of Ring Area) The Ring Area means the Sumo Ring and the space outside the Ring. Anywhere outside this Ring Area is called Outer Area.

Article 3. (Sumo Ring)

- The Ring shall be in circular shape with its height being 1 in and its diameter 36 in (including the outside of the line that divides the inside of the Ring from its outside). The Ring shall be of black hard rubber (made by Toyo Linoleum: long vinyl sheet NC #R289, or its equivalent) adhered on top of wooden plate.
- Shikiri lines (where robots stand at the beginning of the match) are the two parallel lines with 6 in distance between the lines, drawn in the center of the Ring. The Shikiri lines are painted in brown (or equivalent for reflection of IR light), 0.5 in wide and 6 in long.
- The Ring shall be marked by a white circular line of 1 in thickness. The Ring is within the outside of this circular line.

Article 4. (Space) There should be the space of more than 18 in wide outside the outer side of the Ring. This space can be of any color except white, and can be of any materials or shape, as long as the basic concept of these rules are observed. This area, with the ring in the middle, is to be called the: "Ring Area". If there are markings or part of the ring platform outside these dimensions, this area will also be considered in the Ring Area.

Section 3. Requirements for Robots

Article 5. (Specifications)

A robot must be in such a size that it can be put in a square tube of 6 in wide and 6 in deep. A robot can be of any height. A robot must not be in such a design that its body will be physically separated into pieces when a match starts. The robot with such a design shall lose the match. The design to stretch a robot's body or its parts shall be allowed, but must remain a single centralized robot. Screws or nuts or other robot parts, with a mass of less than 5 grams total, falling off from a robot's body shall not cause the loss of match.

¹ Subject to change. Final rules will be distributed one week prior to competition.

² adopted, with modification, from the Robotics Society of America, <http://www.robotics-society.org/mini-sumo.shtml>, retrieved 1/16/2013

The mass of a robot must be under 1.5 lbs including the attachments and parts. The robot must be so designed that it starts operating a minimum of five seconds after a start switch is pressed (or any method that invokes the operation of a robot).

Article 6. (Don'ts in manufacturing a robot)

- Jamming devices, such as an IR LED intended to saturate the opponents IR sensor, are not allowed. Do not use parts that could break or damage the Ring. Do not use parts that are intended to damage the opponents robot or its operator. Normal pushes and bangs are not considered intent to damage.
- Do not put into a robot's body devices that can store liquid, powder, or air, in which are thrown at the opponent.
- Do not use any inflaming devices.
- Do not use devices that throw things at your opponent.
- Do not stick a robot down onto the Ring, using sucking devices or glue, or use any type of sticky tires (such as double sticky foam tape) or any device to assist in adding more down force (such as a vacuum device).

Section 4. How to Carry Sumo Matches

Article 7. (How to Carry Sumo Matches)

One match shall consist of 3 rounds, within a total time of 3 minutes, unless extended by the Judges.

The team who wins two rounds or receives two "Yuhkoh" points first, within the time limit, shall win the match. A team receives a "Yuhkoh" point when they win a round. If the time limit is reached before one team can get two "Yuhkoh" points, and one of the teams has received one Yuhkoh point, the team with one Yuhkoh point shall win.

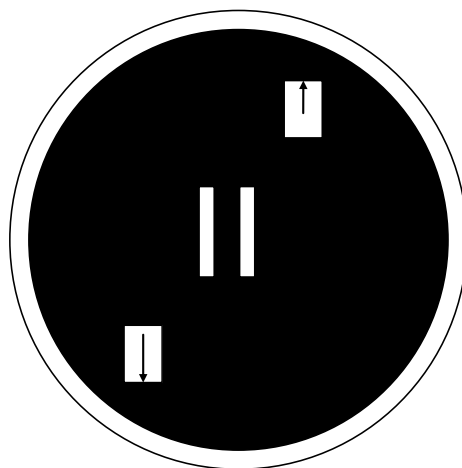
When the match is not won by either team within the time limit, the extended match shall be fought during which the team who receives the first Yuhkoh point shall win. However, the winner/loser of the match may be decided by judges or by means of lots, or there can be a rematch.

One Yuhkoh point shall be given to the winner when the judges' decision was called for or lots were employed.

Section 5. Start, Stop, Resume, End a Match

Article 8. (Start) With the chief judge's instructions, the two teams, go up to the Ring, and place a robot on or behind the Shikiri line or the imaginary extended Shikiri line. (A robot or a part of a robot may not be placed beyond the front edge of the Shikiri line toward the opponent.). A match starts with the following rules:

- For stand-alone robots, be ready to press a start switch. Press the switch when the chief judge announces the start of the round. After 5 seconds, the robot is allowed to start operating, before which players must clear out of the Ring Area.
- Starting positions for the robots will be determined as follows:
 - Round 1: Team A places robot, then Team B places robot
 - Round 2: Team B places robot, then Team A places robot.
 - Round 3 (if necessary): Robots are placed in a "skew position", as shown below



Article 9. (Stop, Resume) The match stops and resumes when a judge announces so.

Article 10. (End) The match ends when the chief judge announces so. The two teams bring the robots out of the Ring Area.

Section 6. Time of Match

Article 11. (Time of Match) One Match will be fought for a total of 3 minutes, starting and ending by the chief judge's announcements. For stand-alone robots, the clock shall start ticking 5 seconds after the start is announced.

Article 12. An extended match shall be for 3 minutes, if called by the Judge.

Article 13. The following are not included in the time of the Match:

- The time elapsed after the chief judge announces Yuhkoh and before the match resumes. 30 seconds shall be the standard before the match resumes.
- The time elapsed after a judge announces to stop the match and before the match resumes.

Section 7. Yuhkoh

Article 14. (Yuhkoh) One Yuhkoh point shall be given when:

- You have legally forced the body of your opponent's robot to touch the space outside the Ring, which includes the side of the ring its self. A Yuhkoh point is also given in the following cases:
 - Your opponent's robot has touched the space outside the Ring, on its own.
 - Either of the above takes place at the same time that the End of the Match is announced.
 - When a robot has fallen on the Ring or in similar conditions, Yuhkoh will not be counted and the match continues.
 - When judges' decision is called for to decide the winner, the following points will be taken into considerations:
 - Technical merits in movement and operation of a robot
 - Penalty points during the match
 - Attitude of the players during the match
 - The match shall be stopped and a rematch shall start when:
 - Both robots are in clinch and stop movements for 10 seconds, or move in the same orbit for 10 seconds, with no progress being made. If it is not clear if progress is being made or not, the Judge can extend the time limit for a clinch or orbiting robots up to 30 seconds.
 - Both robots move, without making progress, or stop (at the exact same time) and stay stopped for 10 seconds without touching each other. However, if one robot stops its movement first, after 10 seconds, he shall be considered not having the will to fight, and the opponent shall receive a Yuhkoh, 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.
 - 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.

Section 8. Violations

Article 15. (Violations) If the players perform the deeds as described in Articles 6, 16, and 17, the players shall be declared as violating the rules.

Article 16. The player 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 any insulting action..

Article 17. A player:

- Enters into the Ring during the match, except when the player does so to bring the robot out of the Ring upon the chief judge's announcement of Yuhkoh or stopping the match. To enter into the Ring means:
 - A part of the player's body is in the Ring, or
 - A player puts any mechanical kits into the Ring to support his/her body.
- Performs the following deeds:
- Demands to stop the match without appropriate reasons.
- Takes more than 30 seconds before resuming the match, unless the Judge announces a time extension..
- Starts operating the robot within 5 seconds after the chief judge announces the start of the match (for stand-alone robots).
- Does or says that which should disgrace the fairness of the match.

Section 9. Penalties

Article 18. (Penalties) Those who violate the rules with the deeds described in Articles 6 and 16 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.

Article 19. Each occasion of the violations described in Article 17 shall be accumulated. Two of these violations shall give one Yuhkoh to the opponent.

Article 20. The violations described in Article 17 shall be accumulated throughout one match.

Section 10. Injuries and Accidents during the Match

Article 21. (Request to stop the Match) A player can request to stop the game when he/she is injured or his/her robot had an accident and the game cannot continue.

Article 22. (Unable to continue the Match) When the game cannot continue due to player's injury or robot's accident, the player who is the cause of such injury or accident loses the match. When it is not clear which team is such a cause, the player who cannot continue the game, or who requests to stop the game, shall be declared as the loser.

Article 23. (Time required to handle injury/accident) Whether the game should continue in case of injury or accident shall be decided by the judges and the Committee members. The decision process shall take no longer than five minutes.

Article 24. (Yuhkoh given to the player who cannot continue) The winner decided based on Article 22 shall gain two Yuhkoh points. The loser who already gained one Yuhkoh point is recorded as such. When the situation under Article 22 takes place during an extended match, the winner shall gain one Yuhkoh point.

Section 11. Declaring Objections

Article 25. (Declaring Objections) No objections shall be declared against the judges' decisions.

Article 26. The team can present objections to the Committee, before the match is over, if there are any doubts in exercising these rules. If there is no Committee member present, the objection can be presented to the Judge, before the match is over.

Section 12. Requirements for Identifications for Robots

Article 27. (Identifications for Robots) Some type of name or number, to identify the robot (as registered in the contest) must be easily readable on the robot's body, while the robot is in competition..

Section 13. Miscellaneous

Article 28. (Flexibility of Rules) As long as the concept and fundamentals of the rules are observed, the rules shall be so flexible that they will be able to encompass the changes in the number of players and of the contents of matches.

Article 29. (Change in Rules) Any changes to or obsolescence of these rules shall be decided by the General Committee Meeting based on the Sumo Match Committee Rules.