



SUMO CHALLENGE: SUMO REGULATIONS

SUMO 31/10/2015

[include regulations of: Sumo, MiniSumo+, MicroSumo+, Nanosumo, Lego Sumo, Humanoid Sumo.]

Please note:

In categories: Sumo / MiniSumo+ / MicroSumo + robots must be able to remotely start and stop - according to the rules!

Categories „with plus” (MiniSumo +, MicroSumo +) are held on enlarged dohyos – which are not standard for these categories.

In 2015, there will be only one category for robots MiniSumo ("MiniSumo plus") on the dohyo 154cm.

New points: 4.2 c) including so-called "card test" and 4.2 d) about so-called "start module"

1. Short description of competition

Two robots fight against each other and try to push the opponent's robot off the ring. All the robots are fully autonomous and every decision and action of robot depends of its algorithm. This competition is organized into various weight classes:

- Sumo (or StandardSumo)
- MiniSumo+
- MicroSumo+
- NanoSumo
- LEGO Sumo
- Humanoid Sumo

2. System of the matches

When necessary, competition consists of two phases: group stage and final stage:

- a) group stage, when robots fight with each robot in their group according to the schedule
- b) if required, additional group round may be announced in order to select the competitors for the finals
- c) final stage is held in a single-elimination tournament system

3. Dohyo specifications

The fights take place on a Dohyo.
Dohyo is a kind of a ring for robots.

Several properties of a dohyo for Sumo Robots:

material - veneered chipboard

shape - round

color - black, with white margin

Class	Height [cm]	Diameter [cm]	Margin Width [cm]	Minimum Exterior Space [cm]
Standard/Mini+/Humanoid/LEGO	5	154	5	100
Micro+	2,5	77	2,5	50
Nano	0,4	19,2	0,6	25



SUMO CHALLENGE: SUMO REGULATIONS

3.1) The allowable error for each dimension of the ring is 5%.

4. Robot specification

4.1) Dimensions (at START) measured in [cm] and weight measured in [g]:

Class	Height [cm]	Width [cm]	Length [cm]	Weight [cm]
StandardSumo	unlimited	20	20	3000
MiniSumo+	unlimited	10	10	500
MicroSumo +	5	5	5	100
NanoSumo	2,5	2,5	2,5	25
Humanoid Sumo	50	20	20	3000
Lego Sumo	unlimited	20	20	1500

a) These restrictions include robot dimensions at START moment - after this moment robot can increase its size.

b) The allowable error of measurement devices is 1%.

c) In Lego Sumo category robots have to be built using LEGO parts only (including Mindstorms)

4.2) Requirements and restrictions

a) robots have to be fully autonomous (no connection with external devices). The only permitted form of the communication is remote START / STOP executed by the referee.

b) Robots cannot contain any devices and parts, which:

- intentionally disturb opponents control system actions (e.g. flash light)
- can damage Dohyo (i.e. milled metal wheels)
- emit gases, liquids, powders
- throw things or shoot at opponent
- stick robot to surface of the Dohyo

c) during the event, robots have to pass the so-called "card test", which verifies if robots does not have too sticky wheels. After putting a robot on a blank A4 paper sheet (with grammage 80g/m²) robot cannot lift a sheet by it wheels. Even minimal lifting causes in non-admission to fight.

d) robots in Sumo/MiniSumo+/MicroSumo+ classes must be equiped with remote START/STOP according to standard described on <http://p1r.se/startmodule/> (38 KHz). Suitable electronic components can be implemented on your own or using the so-called "start modules". You can rent a module from organizers during the event. In case of ambiguity or questions related to this kind of robot control, please contact the organizers.

4.3) In **Humanoid Sumo** category every robot must meet a number of additional limitations for this class, as listed below (In Attachment 1). It is allowed to use off-the-shelf constructions, however, robot has to be modified and programmed in order to autonomously complete the task.

5. Qualification



SUMO CHALLENGE: SUMO REGULATIONS

Robots have to fulfill all the requirements given in point 4. Each team is required to submit their robots to the official measuring and weighing before the start of the competition.

5.1 "Dope tests"

During the competition random weight tests are planned to prevent of cheating. Additional "card tests" during the event are possible.

6. Rules of the Game

Robots are supported by the representatives of their teams. The Game consists of three rounds (or two if the same robot wins twice).

6.1) Start of the Game

- placing of robots will be determined by the use of small crosses of plexiglas. Cross divides dohyo into four quadrants - robots must be placed in opposite quadrants, parallel to each other and pointed in opposite directions which are indicated by arrows on the cross
- The referee decides whether the robots are positioned correctly. Referee may ask competitors to place robots at greater distance from each other (especially in Mini Sumo +)

6.2) About the Game

- In StandardSumo / MiniSumo+ / MicroSumo+ categories robots have to start fight immediately after the remote START command is sent by referee
- if robot does not start after start command (or starts with delay greater than 500ms) the round is interrupted and then repeated
- in NanoSumo / Lego Sumo / Humanoid Sumo categories robots start no sooner than 5 seconds after referee's verbal START command. During this time, they cannot take any actions
- One round lasts up to 1 minute – round is repeated if exceeds 1 minute
- The end of the round is announced by the referee
- The winner is the one who wins more rounds during the Game

6.3) Scoring for all categories (except Humanoid Sumo)

A robot wins the round if:

- it pushes the opponent outside the dohyo (opponent touches space outside the ring)
- opponent leaves the dohyo by itself
- opponent does not move after "Start" command
- operator of the opponent robot don't start the match after referee's call (more than 2 minutes)
- operator of the opponent robot gets 2 warnings.

6.4) Scoring for Humanoid Sumo robots is included in Attachment 1

6.5) Warnings

Competitor gets a warning when:

- entered the forbidden zone (each point at a distance less than declared in Regulations) before announcing the end of the round by the referee
- was preparing the robot too long (over 1 minute) for the next round



SUMO CHALLENGE: SUMO REGULATIONS

- robot starts any action earlier than 5 seconds after "START" command

6.6) Unpredictable situations:

- if both robots are blocked and cannot make any actions, the referee can order the draw before 2 minutes if both robot's operators agree.
- if both of the robots touch the space outside the dohyo at the same time, the referee orders to repeat the round.
- in any other conditions, the decision belongs to the referee.

6.7) Technical break

The player may ask for a longer break in a duel, if the robot is unable to continue the game. The length of the break in the duel will depend of the competition schedule and will last at least 5 minutes.

7. Remarks

It is forbidden to use in competition off-the-shelf constructions being in the official sale. If the robot is a modified version of the commercial construction, please contact the organizers to agree on the rules of participation. If a participant failed to inform organizers before the competition, the robot will be disqualified during the competition.

The referee decides in every situations which is not contained in the Regulations.

The Organizers have the right to make minor changes in the Regulations until the start of the competition – all changes will be listed in the first lines of these Regulations.



SUMO CHALLENGE: SUMO REGULATIONS

Attachment 1

In this competition, it's ALLOWED to use off-the-shelf constructions being in official sale, however they have to be programmed in order to finish competition task.

Restrictions:

- a) robot must have two legs which length is at maximum 70% of the robot's height. Length of the leg is measured from the point where it touches the ground to the axis that connects the leg to the upper part of the robot
- b) robot must have two (not necessarily active) arms. Arm's length may not exceed a length of the extended leg.
- c) robot must have a head (not necessarily active)
- d) robot should be able to get up from lying
- e) robot cannot walk in a „crouch” - where a knee-joint angle is smaller than 90 degrees
- f) while robot is moving, only one foot can touch the ground
- g) as a foot we consider part of the robot, which touches the ground

- h) Foot can be in any shape or form, as far as it fulfills the following requirements
 - the maximum length of the foot (at any time of the match) has to be at most 50% of the extended leg's length.
 - the maximum length and width of the foot is 20 cm
 - a rectangular outline of the foot cannot, at any time, superimpose the outline of the other foot

Scoring for Humanoid Sumo robots:

a) „Knockdown”

When robot falls down because of opponents action – opponent gets 2 points

b) „Slipdown”

When robot falls down by itself, without any action of the opponent – opponent gets 1 point

c) „Ringout”

When any part of the robot touches ground outside the dohyo – opponent gets 3 points

d) „Knockout”

It occurs when robot couldn't manage to get up in 10 seconds after falling down (regardless the reason). In case of Knockout round is interrupted and opponent wins the round

e) After robot is pushed off the ring (ringout), operator puts it lying anywhere on the other side of the dohyo. Robot has the time to get up determined in regulations. Referee announces start of the countdown.

f) match is interrupted, when robots do not hit each other for at least 15 seconds. This time may be extended to 45 seconds, if it seems that at least one robot would attack the opponent.