

# SUMO ROBOT WRESTLING

**Rules & Regulations: Last modified on February 4, 2002**

**Originally created in Japan by Dr. Mato Hattori; Rules adapted for WCRG by Craig Maynard**

**\* 2002 Rule Change: Tethered robots must use CAT5 network cable for control.**

**\* The 2002 event will be the last time the WCRG size-standard will be used (9 x 9", 5kg). All future events will be Japanese size-standard (20 x 20cm, 3kg).**

## OBJECT

This contest pits your creation against another robot in a field of combat where brute strength and cat-like reflexes combine to create the ultimate battle! The challenge is to create a robot whose sole purpose is to push, throw, flip, drag, or otherwise move your opponent out of a five foot diameter circular ring within three minutes. This competition is the most popular of the events, both to watch and to participate in!

## BACKGROUND

This has been one of the premiere international robotic events, rivaling micromouse in its international appeal. Started in 1990, The Fuji Software company of Japan has continued to sponsor the "Japanese Rules" sumo for a decade, in both Adult and High-School divisions.

Here in North America, we've taken the spirit of the competition to a size larger, increasing the maximum dimensions and weight of the devices so to make it easier and less-expensive for potential competitors to get involved in.

At this robotics event, we run both the autonomous and remote-control classes. This encourages competitors to start by building a strong base robot, enter it the remote-control class, and when they're comfortable with the technology, upgrade it to autonomous. Of course, making a robot that fights all by itself is somewhat more complicated than the remote-controlled variety, but there's a great sense of satisfaction when your robot successfully wins all by itself!

## COMPETITOR DESIGN PARAMETERS

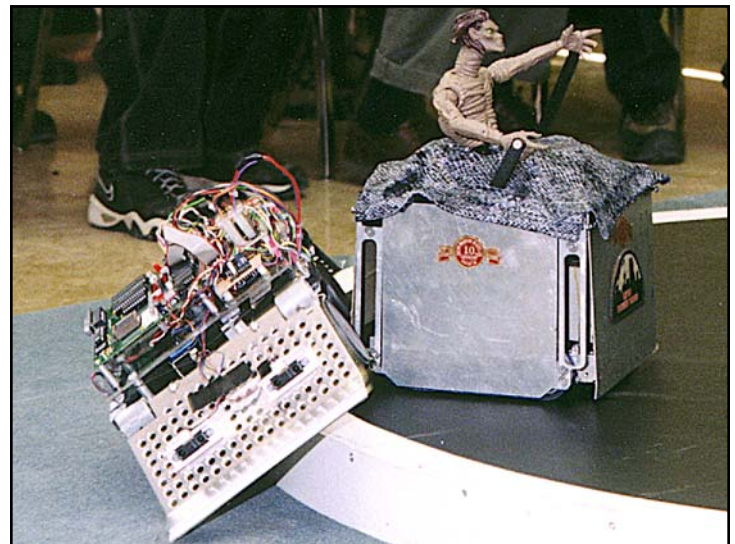
The robots must fit within a 9 inch by 9 inch square at the beginning of the round, but may expand to any size once the contest begins. The height of the robot is unlimited. The robots must weigh 11 pounds or less.

The entire robot must be capable of some form of movement across the ring surface... No cinder-blocks. The robot may not attach itself to anything outside of the ring (with the exception of the operator's control cable).

The robots must not contain any combustible, corrosive, or otherwise dangerous materials for safety reasons. No explosive compression or decompression, either internal or external is permitted. There is a risk of compressed containers rupturing and creating shrapnel. Any robot whose strategy or operation is considered too dangerous will be disqualified by the officials.

Intentional damage or interfering with the opponents operator is not allowed. Good will and friendship between competitors may evaporate if one opponent uses lightening bolts to destroy the electronics of a competitor.

If you have any questions concerning your robots eligibility, please feel free to call the contest organizers and they will be happy to inform you if the robot is legal or not!



*2001 Battle Action between two autonomous competitors.*

**\* Note: Size & Weight will be reduced to 20 cm x 20 cm and 3 kg as of 2003**

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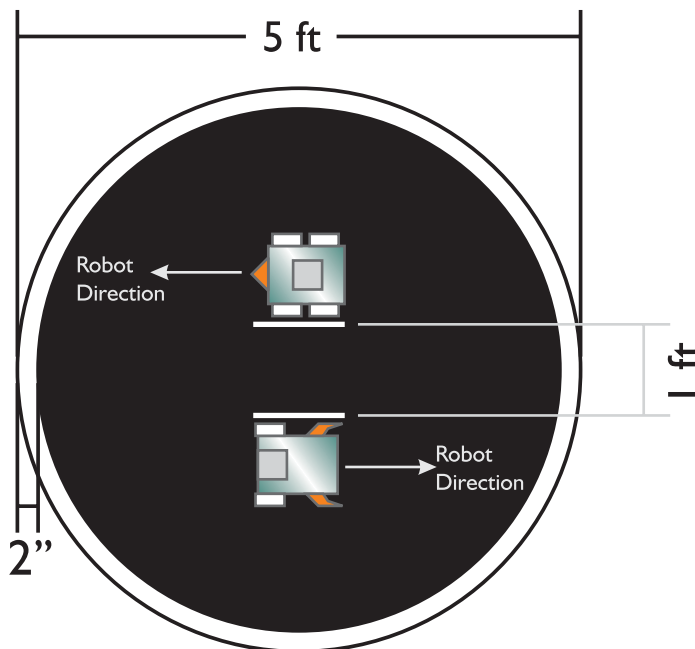
## THE SUMO RING:

Robot SUMO wrestling takes place in a level circular ring exactly 5 feet in diameter with a white 2 inch border along the rings periphery. The surface of the ring is black arborite and sits roughly two inches above ground level.

## AUTONOMOUS CLASS:

Autonomous robots and remote control robots are subject to the same rules, with the following exceptions:

- Autonomous robots must not receive any prompts or cues from the operator. All motivation and control must come from within the robot itself.
- When placed in their starting position, autonomous robots will be placed NOT FACING directly toward the competition. This will allow the robot to demonstrate its searching algorithm ( Robots which simply steamroller straight forward will not necessarily contact the opponent! ).

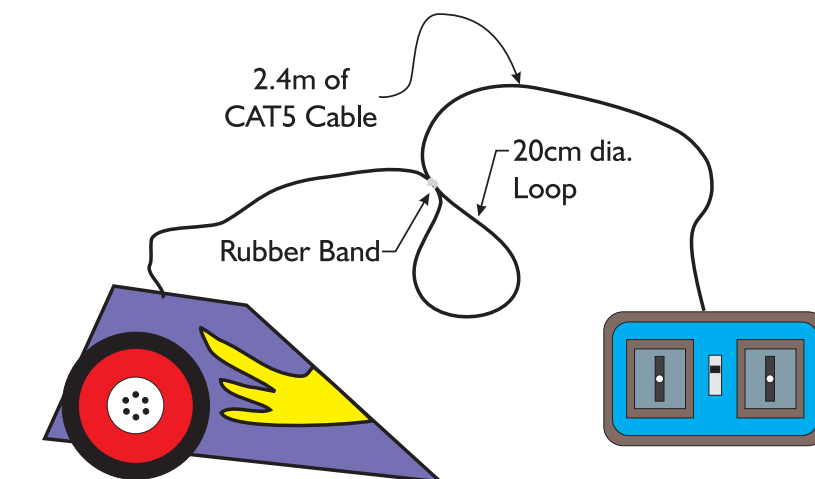


## REMOTE CONTROLLED ROBOTS:

These robots may be controlled from outside the ring by a single operator using radio control or tether control. ( Tether control robots are those wired to an external control box ). Tether controlled robots must not allow the control line to come in contact with the ring or competitor or be used to physically pull the controlled robot. Also, the main power supply for the robot must be in the robot body itself, not in the control unit. Any violation of this rule may cause the robot to be disqualified by the judges.

## NEW RULE MODIFICATION FOR 2002:

- 1) Due to past experiences witness with high-current causing "smoke-shows" in controllers, tethered robots can now only be connected to the controller by a single length of 8-conductor, CAT5 networking cable, minimum 240cm (~8 feet) long. No substitutes will be allowed.
- 2) Competitor complaints regarding tethered robots "being pulled back from the edge" have prompted us to add this rule: A 20cm loop must be rubber-banded into the cable, so any undue tension on the cable will cause the loop to visibly shrink. If any action on the behalf of the operator causes his own loop to pop the rubber band off, he will have forfeited that round of the match.



# SUMO ROBOT WRESTLING

## COMPETITION PROCEDURE:

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The robots are placed on the ring exactly 1 foot apart and equal distance from the center of the ring. The robots are set down parallel to each other and facing opposite directions so that autonomous robots must actively search for the opponent and not merely "steamroller" straight forward.

When both contestants are ready, the ring judge will signal the start of the three minute round at which time the robots may be activated (you may physically flick a switch on your robot). No movement must occur before the official start ( no posturing ).

The robots will proceed in combat until one unit is disabled or removed from the ring. If a bout is won before the 3 minute round is up, the clock will be stopped and the robots replaced in their starting position for a second bout. There may be up to three bouts in a three minute round, with the winner being the robot which wins the most bouts in the round (to a maximum of 2 wins i.e. best 2 out of three). Each contestant is guaranteed a minimum of three rounds, and is awarded points per round on the following basis.

1. The contestant wins the round: 2 points awarded.
2. The contestant ties the round: 1 point awarded.
3. The contestant loses the round: 0 points awarded.

The contestants who accumulate the most points will make it the finals where 1st, 2nd, and 3rd place will be decided by a round robin.

A robot is considered to be removed from the ring when any of its wheels or legs are over the edge and its center of mass begins to tip. A robot whose body hangs over the edge is not considered 'off' until it physically tips off the edge and touches outside the ring. Judgment of the ring officials is final.

Should one robot become disabled ( flipped on it's back or side, for instance ) and is unable to move, the ring officials will award that bout to the remaining robot and a new bout will begin if time permits.

If both robots are stuck in an entanglement or deadlock, then the clock will be stopped and the judges will ask the contestants if they want to restart the bout from the robots starting positions, Both players must agree to this, if not, the bout continues as normal.

At the end of each round, the contestants are responsible for making sure the ring is clean and ready for the next round to the satisfaction of the judges, or the contestant which produced the mess may be disqualified. This includes all debris, fluids, or marks remaining on the ring.

## JAPANESE SUMO ROBOT STANDARDS

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Neglecting the operation aspect of Japanese Robot Sumo Wrestling Rules, the physical parameters of these robots are as follows (as drawn from the official specifications at <http://www.fsi.co.jp/sumo-e/out/outa0000.html#3>):

- The robot must be able to fit in a box with a width and depth of 20cm (no restriction on height).
- Weight (including accessories) must not exceed 3kg (excluding the mass of the tether and remote control unit).
- The robot must not include any part that fixes the robot to the Dohyo surface and prevents it from moving (such as suckers, glue and so on).

These rules will make your robot conform to the vast majority of Sumo Wrestling events in the world. ★