Sumo Robot Wrestling Rules - 2019/2020

# Overview

* Sumo robot wrestling consists of 3-bout matches between 2 fully-autonomous, self-contained robots on a circular wrestling ring
* at the start of every bout, and after a short time delay, each robot must actively try to find its opponent and push it out of the ring
* the first robot expelled from the ring such that it is not able to re-enter the ring on its own loses the bout (ie. when one or more wheels leave the ring)
* the winner of each match is determined after two robots play 3 bouts from different starting positions (side-by-side with opponent to the right, side-by-side with opponent to the left, and back-to-back)

# Sumo Ring

* the Sumo ring consists of a black-painted cylindrical wooden ring, between 1m and 1.5m in diameter, and approximately 1-1.5cm in thickness, with a 2-3 cm wide white-painted border marking the outside edge
* different ring materials, surface textures, and surface reflectivities may be encountered by your Sumo robot, and it should be able to adapt itself to the characteristics of the ring

# Sumo Robot Physical Characteristics

* the entire sumo robot and all of its components must fit within a 20cm length by 20cm width by 20cm height cubic volume at the start of each bout
* during a bout, a sumo robot may unfold or expand one or more parts of itself to become larger than 20cm in any direction
* robots may not drop or eject any parts of themselves on to or out of the ring – any part separated from the robot will be treated as a mechanical failure, forfeiting that bout
* robots may not mark, adhere to, or damage the ring in any way – only wheels, skids and contact sensors should be in contact with the ring
* robots may not damage their opponent deliberately in any way – robots designed to deliberately damage their opponents will be disqualified from the competition
* parts of robots that cause accidental damage to an opposing robot will be required to be removed, or the robot may be disqualified from competition

# Qualification

* each Sumo robot must adhere to all of the rules and demonstrate: 1) a 5s delay after activation, 2) remote, autonomous obstacle sensing, and 3) detection and avoidance of the edge of the ring

# Sumo Robot Propulsion

* robots must use 2 GM8 gear motors and attached wheels driven by a self-contained 6V source (4-AA batteries or equivalent) for propulsion
* additional motors of any type (eg. DC, servo, stepper) are allowed on the robot for functions other than propulsion
* additional batteries of different potentials are allowed for powering circuits other than those driving the GM8 propulsion motors
* 6.0V can be derived from a circuit connected to a non-6V battery pack for the purpose of driving the propulsion motors

# Sumo Robot Sensors

* robots must be able to sense the boundaries of the ring using optical or contact floor sensors, and must demonstrate avoidance of the edge of the ring during qualification
* robots must be able to remotely sense their opponent using non-contact sonar or optical sensors, and must demonstrate object detection during qualification
* additional sensors for sound, contact, proximity, optical or other inputs directly related to robot wrestling functions are allowed
* during a bout robots must be fully autonomous – sensors for the purpose of receiving remote control guidance or assistance of any sort are not permitted
* a remote control sensor can be used to activate the robot at the start of the bout, but must not be able to provide any guidance or assistance during the bout

# Sumo Wrestling Match

* two Sumo robots are placed into the ring typically 10-20cm apart, in an orientation directed by the referee
* when the referee starts the bout, robot handlers activate their robots either remotely or by contact, to start a 5 second time delay
* during the 5 second delay the Sumo robots may not move, but may activate any circuits or expand in preparation for the bout
* also during the 5 second delay time the referee, handlers, and all spectators must move at least 1m away from the outside of the ring
* after the 5 second time delay expires, the Sumo robots may begin to move, seek out their opponent, and try to push them out of the ring
* the bout ends when one robot loses by fully or partially leaving the ring in such a manner that it cannot, under its own power, re-enter the ring, or has a mechanical failure including a loss of power, propulsion, or the loss of a component, or when 2 minutes has elapsed without a clear winner as decided by the referee
* if 2 minutes pass without a clear winner, or if a robot pushes its opponent out of the ring but in the process leaves the ring itself, the bout is a draw and may be re-played