

Some principles and formulas we use in the Agar-Server, that you use in your bots logic

1 General Information

- The server runs with consistently 30fps (So $\delta t = 0.03$).
When calculations take too long and 30fps are not possible, there will be less calculations per second but δt will still be corrected to 0.03.
- The calculation order is non-deterministic. That means, that there is no advantage over another player if one blob is larger or longer in play.
- Food and Toxins are randomly added during play. It is possible, that a toxin spawns inside a blob and causing it to explode (Will not happen very often!).
- All blobs of a bot have exactly one target they all move to reach.
- The new position of a blob is calculated, using the following formula:

$Velocity = Velocity \text{ calculated using the universal Target and Mass.}$

$IndividualTargetVec = \text{Vector created for exploding or splitting blobs. Are only temporary.}$

$NewPos = OldPos + Velocity + IndividualTargetVec$

2 Splitting/Exploding

- When a blob explodes or splits, the new blobs will have an additional movement vector.

3 Throwing/Toxin-Split

- When a blob explodes, a blob/toxin splits or food is thrown, the new blobs/food/toxin will be given an additional velocity, which will be added to the normal movement.
- The additional velocity decreases over time. At every timestep the velocity is multiplied by 0.95.
So: $newVelocity = oldVelocity * 0.95$
This is identical for blobs, food and toxin.
- The following velocities will be added:
food: 150
toxin: 100

4 Toxin Calculations

- When a toxin is split and moving, it will adopt the velocity of the last food that is thrown into the toxin.

5 Food Calculations

- When a food is thrown, it will always move in the direction of the bots target.
- Every blob (when exploded or split) of one bot will throw a food. This can result in multiple foods thrown in one time step.