**Brief description of SMA**

### 1 Approach food

To model the approaching behavior of slime mould as a mathematical equation, the following rule is proposed to imitate the contraction mode:

|  |  |
| --- | --- |
|  | (1) |

whereis a parameter with a range of , decreases linearly from one to zero. represents the current iteration,represents the individual location with the highest odor concentration currently found,represents the location of slime mould, and represent two individuals randomly selected from the swarm, represents the weight of slime mould.

The formula of is as follows:

|  |  |
| --- | --- |
|  | (2) |

where , represents the fitness of , represents the best fitness obtained in all iterations.

The formula of is as follows:

|  |  |
| --- | --- |
|  | (3) |
|  | (4) |

The formula of is listed as follows:

|  |  |
| --- | --- |
|  | (5) |
|  | (6) |

where indicates that ranks first half of the population， denotes the random value in the interval of ， denotes the optimal fitness obtained in the current iterative process, denotes the worst fitness value obtained in the iterative process currently, denotes the sequence of fitness values sorted(ascends in the minimum value problem).

### 2 Wrap food

The mathematical formula for updating the location of slime mould is as follows:

|  |  |
| --- | --- |
|  | (7) |

where and denote the lower and upper boundaries of the search range, and denote the random value in [0,1].

### 3 Grabble food

The value of oscillates randomly between and gradually approaches zero as the iterations increase. The value of oscillates between [-1,1] and tends to zero eventually.

|  |
| --- |
| **Algorithm 1** Pseudo-code of SMA |
| Initialize the parameters *popsize,* ;  Initialize the positions of slime mould ;  **While (**  Calculate the fitness of all slime mould;  Calculate the *W* by **Eq.** (5);  **For**  ;  ;  **End**  ;  **End While**  **Return** ; |

**Reference**

[1] Shimin Li, **Huiling Chen**, Mingjing Wang, **Ali Asghar Heidari**, **Seyedali Mirjalili**, Slime mould algorithm: A new method for stochastic optimization, **Future Generation Computer Systems,** 2020.

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