

CLAIMS

1. A method for piloting a set of robots to bring it into or keep it in a predetermined pack configuration and for it to follow a trajectory that is globally parallel to an ideal trajectory, the method comprising, for each robot:

- a step of generation (200) of a guidance instruction for said robot at a given instant corresponding to a correction to be made to the velocity vector of said robot,
- a step of piloting of the robot so as to observe the guidance instruction,
- characterized in that the guidance instructions of each of the robots of the set of robots being determined from a set of constraints common to all the robots, the set of constraints comprising a pack constraint, the pack constraint comprising at least one set of at least one relative positioning constraint between the robot and neighbors of the first order in the pack, the set of at least one relative positioning constraint between the robot and neighbors of the first order in the pack comprising a first distance constraint corresponding to an ideal distance having to separate the robot from its neighbors of the first order in the pack configuration;
- ~~———— a step of piloting of the robot so as to observe the guidance instruction.~~

2. The piloting method as claimed in the preceding claim, in which the set of constraints comprises a constraint of belonging representative of a second relative positioning constraint between each robot and the other robots, that the other robots have to effectively verify to belong to a set of effective neighbors of said robot at the given instant, as well as an ideal four-dimensional trajectory ideally followed by the robots of the set of robots and a confidence range defined by the position of said robot relative to an ideal position corresponding to a position that said robot ought to occupy if it followed the ideal trajectory, and in which the step of generation of the guidance instruction for said robot at

the given instant comprises a step of determination of a set of effective neighbors of said robot verifying the constraint of belonging in the vicinity of said robot, the guidance instruction for said robot at the given instant being generated from the position of said robot:

- 5 - relative to a set of at least one target position defined from an effective position of each of the effective neighbors of the set of effective neighbors and from the pack constraint and relative to a preferred position, corresponding to a point of the confidence range, when the set of the effective neighbors is not empty,
- 10 - relative to the preferred position when the set of effective neighbors is empty.

3. The piloting method as claimed in the preceding claim, in which the confidence range is an ideal position and in which the preferred position is the
15 ideal position.

4. The piloting method as claimed in claim 2, in which the confidence range is a curve, a surface or a volume.

20 5. The piloting method as claimed in any one of claims 2 to 4, in which the step of generation (200) of the guidance instruction comprises:

- an acquisition step (104), to acquire, by means of perception means (7) embedded on board said robot, measurements making it possible to locate the other robots relative to said robot,
- 25 - a selection step (105), using said measurements, in which a set of effective neighbors of the robot concerned is selected that corresponds to a subset of robots of the other robots which observes the constraint of belonging with respect to the robot, the set of effective neighbors being empty when the robot has acquired no measurement enabling it to locate
30 the other robots in the acquisition step.

6. The piloting method as claimed in the preceding claim, in which the step of generation of the guidance instruction for said robot comprises, when the set of effective neighbors comprises at least one robot called effective neighbor, for each effective neighbor:

- 5 - a step of determination (106) of an effective position corresponding to the position effectively occupied by said at least one effective neighbor relative to said robot from measurements making it possible to locate said effective neighbor acquired by said robot,
- a step of determination (107a) of a set of local ideal positions
10 corresponding to the positions that the robot could occupy relative to the effective neighbor to observe the pack constraint and a step of determination (107b) of a target position corresponding to a local ideal position that the robot could reach most rapidly.

15 7. The piloting method as claimed in the preceding claim, in which the step of determination of the guidance instruction for said robot comprises:

- a step of determination (109) of a global barycenter corresponding to a weighted average of said at least one target position and of the ideal position by first and respectively second weights,
- 20 - a step of determination (111) of a position error affecting the position of the robot to reach the global barycenter,
- a step of determination (112) of a correction to be made to the velocity vector of the robot so as to reduce this error.

25 8. The piloting method as claimed in any one of claims 2 to 7, in which the single set of constraints comprises at least one constraint that is variable as a function of a measurable parameter.

9. The piloting method as claimed in any one of claims 2 to 7, in which the
30 single set of constraints comprises at least one constraint having a single value.

10. The piloting method as claimed in any one of the preceding claims, in which, when no obstacle verifying a predetermined avoidance condition is detected by the robot, the step of generation of the guidance instruction for the robot is performed at regular time intervals and is followed by a step of piloting
5 of the robot so that it observes the guidance instruction, and, when the robot detects at least one obstacle verifying the obstacle avoidance condition, a step of generation of an obstacle avoidance guidance instruction followed by a step of piloting of the robot so that it observes the obstacle avoidance guidance instruction.

10

11. The piloting method as claimed in the preceding claim, in which each robot generates said guidance instruction and handles the piloting step so as to observe the guidance instruction.

15 12. The method as claimed in any one of claims 2 to 11, in which, the confidence range is further defined by the orientation relative to the three-dimensional ideal trajectory included in the four-dimensional trajectory.

13. A set of robots suitable for implementing the method as claimed in any
20 one of the preceding claims, comprising guidance means embedded on board each of the robots, the embedded guidance means being configured so as to
| implement the step of generation of the guidance instruction.