Publicacions més rellevants de la línia de recerca:

Mètodes geomètrics en robòtica: Visió per computador i singularitats de manipuladors paral·lels

Referència: Alberich-Carramiñana, M., Torras, C. and Thomas, F. Flagged parallel manipulators. *IEEE Transactions on Robotics*, **23(5)** (2007), pp. 1013–1023.

Abstract: The conditions for a parallel manipulator to be flagged can be simply expressed in terms of linear dependencies between the coordinates of its leg attachments, both on the base and on the platform. These dependencies permit to describe the manipulator singularities in terms of incidences between two flags (hence, the name "flagged"). Although these linear dependencies might look, at first glance, too restrictive, in this paper the family of flagged manipulators is shown to contain large subfamilies of six-legged and three-legged manipulators. The main interest of flagged parallel manipulators is that their singularity loci admit a well-behaved decomposition, with a unique topology irrespective of the metrics of each particular design. In this paper, this topology is formally derived and all the cells, in the configuration space of the platform, of dimension 6 (non-singular) and dimension 5 (singular), together with their adjacencies, are worked out in detail.

Referència: Torras, C., Thomas, F. and Alberich-Carramiñana, M. Stratifying the singularity loci of a class of parallel manipulators. *IEEE Transactions on Robotics*, **22(1)** (2006), pp. 23–32.

Abstract: Some in-parallel robots, such as the 3-2-1 and the 3/2 manipulators, have attracted attention because their forward kinematics can be solved by three consecutive trilaterations. In this paper, we identify a class of these robots, which we call flagged manipulators, whose singularity loci admit a well-behaved decomposition, i.e., a stratification, derived from that of the flag manifold. Two remarkable properties must be highlighted. First, the decomposition has the same topology for all members in the class, irrespective of the metric details of each particular robot instance. Thus, we provide explicitly all the singular strata and their connectivity, which apply to all flagged manipulators without any tailoring. Second, the strata can be easily characterized geometrically, because it is possible to assign local coordinates to each stratum (in the configuration space of the

manipulator) that correspond to uncoupled rotations and/or translations in the workspace.

Referència: Espuny, F. A new linear method for camera self-calibration with planar motion. *Journal of Mathematical Imaging and Vision*, **27(1)** (2007), pp. 81–88.

Abstract: We consider the self-calibration (affine and metric reconstruction) problem from images acquired with a camera with unchanging internal parameters undergoing planar motion. The general self-calibration methods (modulus constraint, Kruppa equations) are known to fail with this camera motion. In this paper we give two novel linear constraints on the coordinates of the plane at infinity in a projective reconstruction for any camera motion. In the planar case, we show that the two constraints are equivalent and easy to compute, giving us a linear version of the quartic modulus constraint. Using this fact, we present a new linear method to solve the self-calibration problem with planar motion of the camera from three or more images.