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The problem of associating the features of a moving object in sequential images without estimates of object motion or structure (relative position of features) is addressed. A method is presented and analyzed for associating features even if some of the features are occluded (not visible in one or more of the images of interest). The method models the object as a rigid set of point reflectors each with independent reflectivity that is correlated from image to image. (Compare with Swerling case 3.) Object motion is modeled as a circular trajectory in a known plane. It requires measurements of position plus Doppler. Such measurements are available from monopulse radar and some sonar and laser imaging systems. The method assumes all possible associations and minimizes the least trimmed squares (LTS) of error residuals to remove erroneous associations. Byproducts of the minimization include estimates of object motion and feature structure.

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Feature Association

Without a Motion Estimate

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