This is a classic paper in the field of fuzzy control systems, being one of the earliest. To my knowledge, it may also be considered the first paper dealing with fuzzy logic for mobile robot control. The authors’ objective was to create a fuzzy rule system which could guide a model car through a crank-shaped course. This was accomplished by identifying four variables in the geometric relationship between the course and car, which were inputs to their fuzzy rule system. The authors used 20 control rules mapping the four input measurements to one steering angle output. For each rule, each of the four inputs was assigned a scalar coefficient which implements the relative importance of the premise, and ultimately of the given rule, in determining the car’s final steering response.

This paper, for its short length and age, provides good insight into the use of fuzzy systems to control mobile robots. Whereas it may be the earliest paper on the subject, it goes into a good level of mathematical detail in how to implement such a fuzzy control system. Although their crank-shaped course geometry, and therefore their work as a whole, seems rather specific, their treatment of the mathematical foundations of such an application allows one to imaging how such a navigation system might be developed for similar applications. For instance, they describe subsets of their rules as being for different things, the first two being for keeping away from the outer wall, and the others being for smooth steering. This seems to preempt later behavior-based navigation schemes, and serves as a potential starting point for someone wishing to construct such a navigation system.