18. H. Tanaka, *Propagation of chaos for certain purely discontinuous processes with interaction*, J. Fac. Sci. Univ. Tokyo Sect. IA Math. **17** (1970), 259–272.

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Transformation groups, by Tammo tom Dieck. Studies in Mathematics, vol. 8, Walter de Gruyter, Berlin, New York, 1987, x + 311 pp., $71.00. ISBN 0-89925-029-7

In 1981 **[9]**, I reviewed a book with a similar title **[5]** by the same author. There has been considerable progress in this general area since then. Both books focus on topics in equivariant topology, the study of spaces with group actions, primarily actions by compact Lie groups.

In geometric topology, the study of high dimensional manifolds has more and more come to focus on problems concerning smooth, *PL*, and topological group actions. In algebraic topology, classical homotopy theory has moved more and more in the direction of equivariant theory, although there is still a little gap between those who approach problems from an equivariant point of view and those who approach problems from a more classical point of view.

Some of the most important work in algebraic topology since 1981 has concerned the Segal conjecture, the Sullivan conjecture, and various generalizations and applications of those results. Much of this work is intrinsically equivariant in nature. Perhaps a little discussion of these results will illuminate the difference in points of view one can take on these matters.

The Sullivan conjecture, in its generalized form, starts with a finite p-group G, a contractible space EG with a free action by G, and a G-space X. One defines the "homotopy fixed point space of X," denoted X^{hG}, to be the space of G-maps $f\colon EG \to X$. To say that f is a G-map just means that $f(gy) = gf(y)$ for $g \in G$ and $y \in EG$. If x is a fixed point of X, so that $gx = x$ for all $g \in G$, then we have the constant G-map f_x specified by $f_x(y) = x$ for all $y \in EG$. There results an inclusion $\iota\colon X^G \to X^{hG}$. A special case of the "homotopy limit problem" **[12]** asks how near this map is to being a homotopy equivalence. Roughly speaking, the generalized Sullivan conjecture asserts that this map becomes an equivalence after p-adic completion when X is finite dimensional. The conjecture has been proven independently by Haynes Miller, Jean Lannes, and Gunnar Carlsson **[4, 7, 10]**, and numerous authors have obtained interesting applications. While the statement may seem technical and unintuitive, the fact is that the result opens the way to a variety of concrete calculations in homotopy theory of a sort unimaginable just a few years ago.

There is a slightly different, more equivariant, way of thinking about the generalized Sullivan conjecture. One can consider the space Map(EG, X) of