

CHAPTER 12

Comparison of Two Factorization Methods: Cross Section Versus Proper Action

The factorization method of Andersson, Brøns, and Jensen (1983) was mentioned briefly in Chapter 1. For brevity we shall term this the “ABJ” method, whereas the method that uses construction of a cross section—as developed in this monograph—will be designated by “W.” It was mentioned in Chapter 1 that the main assumption made in the ABJ method is that the l.c. group G acts *properly* on the l.c. space \mathcal{X} (Definition 2.3.6). In the W method, properness of the action of G , although not explicitly assumed, is implied by Assumption 8.2. For, \mathcal{X} is homeomorphic to $\mathcal{Y} \times \mathcal{T}$ by Proposition 8.4, and G acts properly on $\mathcal{Y} \times \mathcal{T}$ since it acts trivially on \mathcal{T} and properly on \mathcal{Y} by the compactness of G_0 (Proposition 2.3.11). Thus, both the ABJ and the W method rely on properness of the action of G . Below we shall concentrate on differences between the two methods.

In the ABJ method it is further assumed that there is another l.c. space \mathcal{Y} on which G acts transitively and properly, and that there is a continuous and equivariant function $u : \mathcal{X} \rightarrow \mathcal{Y}$, where u represents some statistic of interest. (Actually, this function is denoted t in ABJ. We have changed the notation from t to u in order to avoid confusion with the maximal invariant t of Chapter 8.) For instance, in the