ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 30, Number 4, Winter 2000

A WALLMAN-SHANIN-TYPE COMPACTIFICATION FOR APPROACH SPACES

R. LOWEN AND M. SIOEN

ABSTRACT. In [**11**] a Čech-Stone-type compactification theory was developed for $\mathbf{UAP}_2$. In this paper we construct a Wallman-Shanin-type compactification theory for weakly symmetric T_1 approach spaces which form a full subcategory of **AP** properly containing $\mathbf{UAP}_2$. For a weakly symmetric T_1 approach space, we also investigate the relation between the topological bicoreflection of its Wallman-type compactification and the classical Wallman compactification of its topological bicoreflection, and we show that our theory extends the classical topological Wallman compactification theory. It is shown in [**14**] that our present theory also extends the Čech-Stone-type theory from [**11**].

1. Introduction. In the 'classical' study of extensions of topological spaces, a significant role is played by compactification theories, in particular, by the Wallman-Shanin compactification theory since it applies to all T_1 topological spaces. This approach, based on the use of so-called closed ultrafilters, was put forward by Wallman in his 1938 paper [**16**], where he defined his 'ultrafilter space' in the setting of distributive lattices and then applied the result to the lattice of all closed sets of a T_1 topological space, obtaining the so-called Wallman compactification, which for normal spaces yields the well-studied Čech-Stone compactification. His ideas were subsequently generalized by Banaschewski [**2**] who defined what he called a "Wallman basis" to construct Hausdorff compactifications of Tychonoff topological spaces. See also Frink [**4**], who used what he called 'normal basis' to end up with Hausdorff compactifications for Tychonoff topological spaces, and by Steiner [**15**], using the concept of a 'separating base' to create more general T_1 compactifications for T_1 spaces. This last line of work is also followed in [**12**] and we refer hereto for more details, since we will restrict ourselves to listing basic definitions and facts concerning

The second author is an Aspirant van het Fonds voor Wetenschappelijk Onderzoek, Vlaanderen.
Received by the editors on April 22, 1999, and in revised form on October 18, 1999.