

Preface

This monograph deals with two closely related variants of periodic cyclic homology, called analytic and local cyclic homology. I introduced analytic cyclic homology in my doctoral thesis ([65]) in 1999, based on the entire cyclic cohomology due to Alain Connes. There I observed the relevance of bornological vector spaces and studied the formal properties of analytic cyclic homology, including a more conceptual proof of the excision theorem. I was inspired by the work of Michael Puschnigg on local cyclic homology and Joachim Cuntz's construction of bivariant K-theories ([17]), which had emphasised the role of abstract homological properties.

Large parts of this monograph are based on my thesis. But as quite some time has passed since then, I have rewritten it almost entirely. The main change in content is the inclusion of bivariant local cyclic homology. When formulated suitably, this theory is quite close to the analytic theory. The main difference is that complete bornological vector spaces are replaced by inductive systems of Banach spaces. Although the definitions are similar, the local theory has much better formal properties. Much of the additional material is needed to define the local theory and establish its nice properties.

Although we also deal with periodic cyclic homology here, this mainly serves to point out similarities and differences between the periodic and the analytic and local cyclic theories. If you are unfamiliar with periodic cyclic homology, you may want to consult [20] first in order to get a rough idea of its basic properties.