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Higher homotopy operations and André-Quillen cohomology

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There are two main approaches to the problem of realizing a Π-algebra (a graded group Λ equipped with an action of the primary homotopy operations) as the homotopy groups of a space X. Both involve trying to realize an algebraic free simplicial resolution $G_\bullet$ of Λ by a simplicial space $W_\bullet$ and proceed by induction on the simplicial dimension. The first provides a sequence of Andr\'{e}-Quillen cohomology classes in $H_{AQ}^{n+2}(\Lambda;\Omega^{n}\Lambda)$ for $n \geq 1$ as obstructions to the existence of successive Postnikov sections for $W_\bullet$ by work of Dwyer, Kan and Stover. The second gives a sequence of geometrically defined higher homotopy operations as the obstructions by earlier work of Blanc; these were identified with the obstruction theory of Dwyer, Kan and Smith in earlier work of the current authors. There are also (algebraic and geometric) obstructions for distinguishing between different realizations of Λ. In this paper we
1) provide an explicit construction of the cocycles representing the cohomology obstructions;
2) provide a similar explicit construction of certain minimal values of the higher homotopy operations (which reduce to "long Toda brackets"), and
3) show that these two constructions correspond under an evident map.

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