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The paper is organized as follows:

§ 1 and 2. Various definitions of acyclic maps are given and the basic properties are worked out.

§ 3. Acyclic maps, up to homotopy equivalence, defined on a given space X are in bijective correspondence with the perfect normal subgroups of $\pi_1(X)$. Functorial aspects of acyclic maps are discussed.

§ 4. Dror's functor [D1] is shown to be the homotopy fibre of the plus construction and the plus construction is the homotopy cofiber of the Dror map. A strongly functorial plus construction can be deduced from this.

§ 5. We study acyclic maps $f : X \rightarrow Y$ with trivial action of $\ker \pi_1(f)$ on $\pi_*(X)$. In this situation there is a good relation between $\pi_*(X)$ and $\pi_*(Y)$ which is not the case for a general acyclic map.

§ 6. We classify acyclic maps $f : X \rightarrow Y$ into a fixed space Y for which $\ker \pi_1(f)$ acts trivially on $\pi_1(X)$ for $i > 2$.

For a general acyclic map there is a Dror-Postnikov decomposition of f generalizing the results of Dror [D1, D2]. It is an interesting problem to classify the n^{th} -stages of this decomposition in terms of invariants like those in Dror [D1, D2].¹⁾

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¹⁾ Results in this direction have been recently obtained by W. Meier.