



n-Nilpotent Obstructions to π_1 Sections of $P^1-\{0,1,\infty\}$ and Massey Products

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Let π be a pro- l completion of a free group, and let G be a profinite group acting continuously on π . First suppose the action is given by a character. Then the boundary maps $\delta_n: H^1(G, \pi/[\pi]_n) \rightarrow H^2(G, [\pi]_n/[\pi]_{n+1})$ are Massey products. When the action is more general, we partially compute these boundary maps. Via obstructions of Jordan Ellenberg, this implies that π_1 sections of $P^1_k-\{0,1,\infty\}$ satisfy the condition that associated n th order Massey products in Galois cohomology vanish. For the π_1 sections coming from rational points, these conditions imply that $\langle (1-x)^{-1}, x^{-1}, x^{-1}, \dots, x^{-1} \rangle = 0$ where $x \in H^1(\text{Gal}_k, Z_l(\chi))$ is the image of an element of k^* under the Kummer map.

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