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Capitulation and Transfer Kernels

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ABSTRACT. If K/k is a finite Galois extension of number fields with Galois group G, then the kernel of the capitulation map $\mathrm{Cl}_k \to \mathrm{Cl}_K$ of ideal class groups is isomorphic to the kernel $X(H)$ of the transfer map $H/H' \to A$, where $H = \mathrm{Gal}(\tilde{K}/k)$, $A = \mathrm{Gal}(\tilde{K}/K)$ and $\tilde{K}$ is the Hilbert class field of K. H. Suzuki proved that when G is abelian, $|G|$ divides $|X(H)|$. We call a finite abelian group X a transfer kernel for G if $X \cong X(H)$ for some group extension $A \hookrightarrow H \twoheadrightarrow G$.

After characterizing transfer kernels in terms of integral representations of G, we show that X is a transfer kernel for the abelian group G if and only if $|G|X = 0$ and $|G|$ divides $|X|$. Our arguments give a new proof of Suzuki's result.

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