What is the relationship between the (global) units of a number field and the (local) units of the related local fields? Leopoldt conjectured an answer. Informally his conjecture states that the $\mathbb{Z}_p$-rank of the diagonal embedding of the global units into the product of all local units equals the $\mathbb{Z}$-rank of the global units.

I consider the variation: Can we say anything about the $\mathbb{Z}_p$-rank of the diagonal embedding of the global units into the product of some local units? The answer is yes. In particular, in the case of an Abelian extension I use ideas from linear algebra, the theory of linear representations, and Galois theory to give a precise formula for the $\mathbb{Z}_p$-rank (of the diagonal embedding of the global units into the product of some local units) in terms of the $\mathbb{Z}$-rank of the global units and a property of the the local units included in the product. (Received September 15, 2013)