ON THE ISOMORPHISMS OF FOURIER ALGEBRAS OF FINITE
ABELIAN GROUPS

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I will consider the spaces of the form $L^1(G)$ for compact abelian group $G$
edequipped with the Haar measure. More specific I will study algebraic homomorphisms
between the Fourier algebras of the form $A(\hat{G})$ - which is the image of $L^1(G)$
by the Fourier transform.

I will present the result which says that if $\hat{G}$ is a comutative, discrete torsion
group with finite exponent which does not contain a subgroup isomorphic to $Z_n^{p^\alpha}$,
then any homomorphic embedding of $A(Z_n^{p^\alpha})$ into $A(\hat{G})$ has norm minorized
by some function growing to infinity with $n$. Moreover, in two special cases - (1) when
$\hat{G}$ is a $p$-group and (2) when $\hat{G}$ does not contain $p$-groups - an explicite estimation
of the rate of this growth is given.

Any homomorphism between the Fourier algebras on abelian locally compact
groups is given by the corresponding mapping between the groups. Hence the above
theorem can be translated to the study of operators given by permutations of the
Vilenkin systems - which generalize the classical Walsh system - and which are the
characters of the groups $\bigoplus_{k=1}^N Z_{p_k}^\omega$.

In the proof we use the very powerful, and relatively new, machinery from the
Number Theory: the theorem of B. Green and T. Sanders which gives the quantita-
tive description of idempotents of measure algebras (additive combinatorics, 2006)
and the theorem of J. -H. Evertse about finiteness of the number of solutions of
S-unit equations (Diophantine approximations, 1995).

During the lecture I will explain the statement and present the idea of the proof.
This is joint work with A. Czuron.