Mathematisches Institut
der Universität München
Prof. Dr. B. Pareigis

SS 2002
Set 6

Problem set for
Quantum Groups and Noncommutative Geometry

(21) Let H be a Hopf algebra. Then S is an antihomomorphism of algebras and coalgebras i.e. S "inverts the order of the multiplication and the comultiplication".

(22) Let H and K be Hopf algebras and let $f : H \longrightarrow K$ be a homomorphism of bialgebras. Then $fS_H = S_K f$, i.e. f is compatible with the antipode.

(23) Let $\mathbb{K}$ be a field. Show that an element $x \in \mathbb{K}G$ satisfies $\Delta(x) = x \otimes x$ and $\varepsilon(x) = 1$ if and only if $x = g \in G$.

(24) (a) Show that the grouplike elements of a Hopf algebra form a group under multiplication of the Hopf algebra.
(b) Show that the set of primitive elements $P(H) = \{x \in H | \Delta(x) = x \otimes 1 + 1 \otimes x\}$ of a Hopf algebra H is a Lie subalgebra of H^L.

Due date: Tuesday, 04.06.2002, 16:15 in Lecture Hall E41