Scratch 150902

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$\square(\bar{x}_i\bar{y}_i) = \bar{x}_i\bar{y}_i\otimes 1 + \bar{x}_i\otimes\bar{y}_i + \bar{y}_i\otimes\bar{x}_i + 1\otimes\bar{x}_i\bar{y}_i$

primitive iff

$$\bar{x}_i\otimes\bar{y}_i + \bar{y}_i\otimes\bar{x}_i = 0$$

Given G,

$$D_n(G) := \{g : \bar{g}\in I^n\}$$

Claim 1. D_n is a normal subgroup.

Pf if $\bar{x},\bar{y}\in I^n$, then

$$\overline{xy} = xy - 1 = (x-1)y + (y-1) \in I^n$$

$$\overline{x^{-1}} = x^{-1} - 1 = x^{-1}(1-x) \in I^n$$

$$\overline{x^g} = g^{-1}xg - 1 = g^{-1}(x-1)g \in I^n.$$

Claim 2. $(D_n, D_m) \subset D_{n+m}$

Pf If $\bar{x}\in I^n$ & $\bar{y}\in I^m$ then

$$\overline{(x,y)}\,yx = [x,y] = [\bar{x},\bar{y}] \in I^{n+m}$$

so $\overline{(x,y)} \in I^{n+m}$, as I^{n+m} is an ideal.

Thm $\quad \mathcal{A}(G) = \mathcal{U}(\oplus D_n/D_{n+1})$

To prove, need

1. $\pi : \mathcal{U}(\oplus D_n/\quad) \to \mathcal{A}(G)$ easy.

2 An expansion $G \longrightarrow \mathcal{U}\left(\bigoplus \frac{D_n}{D_{n+1}}\right)$