

**NOTE ON THE DEFINING RELATIONS FOR THE
SIMPLE GROUP OF ORDER 660**

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Dickson* has given the following set of defining relations for the simple group of order 660:

- (1) $S^{11} = I, \quad T^2 = I, \quad (ST)^3 = I,$
 (2) $(S^3TS^3T)^2 = I,$
 (3) $(S^4TS^6T)^2 = I.$

It follows from (3) that

$$TS^4T = S^5TS^7TS^5,$$

so that

$$\begin{aligned} TS^8T &= S^5TS^7TS^{10}TS^7TS^5 \\ &= S^5TS^8 \cdot S^{-1}TS^{-1}TS^{-1} \cdot S^8TS^5 \\ &= S^5TS^8TS^8TS^5. \end{aligned}$$

From this last relation

$$\begin{aligned} S^3TS^5TS^5 \cdot S^3TS^3T \cdot S^6T &= I, \\ S^3TS^8T &= S^6TS^6TS^8TS^6, \\ (S^3TS^8T)^2 &= S^6TS^6TS^8TSTS^6TS^8TS^6 \\ &= S^6TS^6TS^7 \cdot STSTS \cdot S^5TS^8TS^6 \\ &= S^6TS^6 \cdot TS^7TS^5T \cdot S^8TS^6 \\ &= S^6TS^6 \cdot S^6TS^4 \cdot S^8TS^6 \\ &= S^6TSTSTS^6 \\ &= I. \end{aligned}$$

Since (2) has been derived from (1) and (3), it follows that (1) and (3) are sufficient to define the simple group of order 660.

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