Verba Volant, Scripta Manent

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I am grateful to Gunther Cornelissen for the conversations that led to the writing of this article.
Using examples, we attempt to prove the following assertions. None is original to the author, and each is readily contested. As a courtesy, the examples are artificially constructed rather than taken from the mathematical literature.

- Mathematical notation can either help or hinder the reader.
- Commutative algebra and harmonic analysis can be made more or less difficult by font choices.
- Making deliberate choices about line and page breaks can help or hinder the reader.

The so-called grid method in arithmetic amounts to this. To work out $13 \times 15$, think of $(10+3) \times (10+5)$ and expand: $10 \times 10$, $10 \times 5$, $3 \times 10$, and $3 \times 5$. Then we add 100, 50, 30, and 15 to obtain 195.
To avoid confusion, we denote the character group of a locally compact abelian group \( G \) by \( \hat{G} \), and the annihilator of a subgroup \( H < G \) by \( H^\perp \). Then for a closed subgroup \( H \) of \( G \), we have isomorphisms of topological groups as follows:

- \( \hat{G}/H \cong H^\perp \);
- \( \hat{H} \cong \hat{G}/H^\perp \);
- \((H^\perp)^\perp \cong H\), under the identification between \( G \) and the character group of \( \hat{G} \) given by Pontryagin duality.

Let \( R \) be a valuation ring of a field \( K \) and assume that we have \( R \subset R' \subset K \) with \( R \neq R' \). Let \( M \) be the maximal ideal of \( R \), and let \( P \) be the maximal ideal of \( R' \). Then

- \( P \subset M \subset R \) and \( P \neq M \).
- \( P \) is a prime ideal of \( R \) and \( R' \) is the localization \( R_P \).
- \( R/P \) is a valuation ring of the field \( R'/P \).

“90 percent of design is typography. And the other 90 percent is whitespace.” (Jeffrey Zeldman [2])

To avoid confusion, we use the same letter in different fonts, denoting the character group of a locally compact abelian group \( G \) by \( \mathcal{G} \), and the annihilator of a subgroup \( H < G \) with \( \mathcal{H} \). Then for a closed subgroup \( H \) of \( G \), we have isomorphisms of topological groups as follows:

- \( \mathcal{X} \cong \mathcal{H} \) where \( X = G/H \);
- \( \mathcal{H} \cong \mathcal{G}/\mathcal{H} \);
- \( \mathcal{X}' \cong H \), where \( X = \mathcal{H} \), under the identification between the character group of \( \mathcal{G} \) and \( G \).

Let \( \mathfrak{R} \) be a valuation ring of a field \( \mathfrak{K} \) and assume that \( \mathfrak{R} \subset \mathfrak{R}' \subset \mathfrak{K} \) with \( \mathfrak{R} \neq \mathfrak{R}' \). Let \( \mathfrak{M} \) be the maximal ideal of \( \mathfrak{R} \) and let \( \mathfrak{P} \) be the maximal ideal of \( \mathfrak{R}' \). Then

- \( \mathfrak{P} \subset \mathfrak{M} \subset \mathfrak{R} \) and \( \mathfrak{P} \neq \mathfrak{M} \).
- \( \mathfrak{P} \) is a prime ideal of \( \mathfrak{R} \) and \( \mathfrak{R}' = \mathfrak{R}_\mathfrak{P} \).
- \( \mathfrak{R}/\mathfrak{P} \) is a valuation ring of the field \( \mathfrak{R}'/\mathfrak{P} \).

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References
