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ERRATUM

Errata for "The linear programming bound for codes over finite Frobenius rings"

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Abstract The authors discovered some mistakes in the article that appeared on pp. 289–301 of the March volume of DCC **42** (2007). The validity of its results is not affected, nor is that of the examples since their computation did not involve the dual version of the LP bound. In any case, we feel the errors need to be rectified here.

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1 The dual version of the linear programming bound

In Sect. 3, R is a finite Frobenius ring and θ and τ are equivalence relations on R. Let $m_{r\theta} = |r\theta|$ and for $\alpha \in \mathbb{N}^{R/\theta}$, let $\mathbf{m}^\alpha = \prod_{r\theta \in R/\theta} m_{r\theta}^{\alpha_{\tau\theta}}$. The dual version of the linear programming bound, Theorem 3.3, should say

$$A_R(n, d) \le 1 + \sum_{\substack{\alpha \in \mathbb{N}^{R/\theta} \\ |\alpha|=n \\ \alpha \neq n\mathbf{e}_0}} d_\alpha \binom{n}{\alpha} \mathbf{m}^\alpha$$

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The factor $\mathbf{m}^\alpha$ did not appear in the original article due to a miscalculation of $Q_\alpha(n\mathbf{e}_0)$. The correct version follows. The quantity $Q_\alpha(n\mathbf{e}_0)$ is implicitly defined by

$$N(\bar{\tau}(x_0^n)) = \sum_{r\theta \in R/\theta} Q_\alpha\,(n\mathbf{e}_0)\; y^\alpha$$

We have

$$N(\bar{\tau}(x_0^n)) = \bar{\theta}(M(x_0^n)) = \bar{\theta}\left(\left(\sum_{r\in R} x_r\right)^n\right) = \left(\sum_{r\theta\in R/\theta} m_{r\theta}\, y_{r\theta}\right)^n$$
$$= \sum_{\alpha\in\mathbb{N}^{R/\theta}} \binom{n}{\alpha} \prod_{r\theta\in R/\theta} (m_{r\theta}\, y_{r\theta})^{\alpha_{r\theta}}$$

Equating terms gives $Q_\alpha(n\mathbf{e}_0) = \binom{n}{\alpha}\mathbf{m}^\alpha$.

2 Other errata

Remark 2.4 $\phi(\theta)$ should be written as $\Phi(\theta)$.

Page 293: In the alternative formula for the homogeneous weight of $r \in R$, we omitted a factor of $|R^\times|^{-1}$. The correct formula hence should be:

$$w_{\text{hom}}(\tau) = \gamma\left[1 - \frac{1}{|R^\times|}\sum_{u\in R^\times} \chi(ru)\right] \quad \text{for all } r \in R,$$

where γ is the constant given in Definition 2.7.
Page 296: Several occurrences of y^α and z^β should read $\mathbf{y}^\alpha$ and $\mathbf{z}^\beta$, respectively.

Example 4.6 The upper bound $A_{\mathbb{Z}_8} \leq 32$ was measured with respect to the Lee distance on $\mathbb{Z}_8$ rather than the homogeneous distance used before.