Supplementary Material for "Evaluating infectious disease forecasts with allocation scoring rules"

Aaron Gerding, Nicholas G. Reich, Benjamin Rogers, Evan L. Ray

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Abstract

We briefly address some technical and methodological points in the main text, referring to the forthcoming ... for more thorough discussion.

- From 2.2.1, why are Bayes act scoring rules proper?
- Explain "All proper scoring rules for probabilistic forecasts have an explicit link to a loss function" from discussion.
- DGP as optimal for any decision problem, ref Diebold, Gunther, Tay p. 866.
- For 2.2.2, how to get quantile representation of Bayes act using Lagrange multiplier, assuming smooth, never-zero densities well behaved at $x = 0$. Work out exponetial example. Refer to methods paper for general case.
- Derivation of quantile scoring rule with quantile as Bayes act for C/L problem, assuming never-zero densities.
- Descriptions of
  - CRPS as average quantile score across $C \in [0/L]$ decision problems
  - IS as average of two quantile scores with a prob-width penalty
  - WIS as average quantile score across 23 C/L problems.
- Sketch of scoring for decision problems involving both cost and constraint.