

Homework 7 - Some hints and suggestions

October 27, 2004

General Remarks Most of the problems are straightforward applications of the material done in class.

Problem 2 Data processing inequality.

Problem 5 The marginal distribution of X_i := *the colour of the i^{th} ball* is the same in both sampling schemes (surprising?). Take advantage of this using the entropy chain rule.

Problem 7 Data processing inequality.

Problem 8 If I tell you that the answer is a geometric distribution, can you show that this is indeed true? What is the parameter it should have?

Problem 9 Define the *leave-one-out* empirical mass function for a sample of size n as

$$\hat{p}_n(i, x) := \frac{1}{n-1} \sum_{k \neq i}^n \mathbf{1}_{\{X_k=x\}}$$

Can you express the full empirical mass function $\hat{p}_n(x)$ as a convex combination of the class $\{\hat{p}_n(i, x)\}_{i=1}^n$?