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CORRECTION

APPROXIMATE *p*-VALUES FOR LOCAL SEQUENCE ALIGNMENTS[1]

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1. Introduction. It has been pointed out to us by D. Metzler (University of Frankfurt) that the proof of Theorem 3 of Siegmund and Yakir (2000) is incomplete. In addition, S. Grossman (Frankfurt) and A. Dembo (Stanford) have observed that some conditions are required in order for the proofs of Theorems 1 and 2 (in particular the proof of Lemma 1) to hold. In this note we give appropriate additional conditions and complete the proof of Theorem 3. We use the notation of our earlier paper.

To describe the conditions for Theorems 1 and 2, we let Q_0 denote the "null" probability given by $Q_0(\alpha, \beta) = \mu(\alpha)\nu(\beta)$ and let $Q_1(\alpha, \beta) = \exp[\theta^* K(\alpha, \beta)] \times Q_0(\alpha, \beta)$ denote the implied "alternative." Also let $Q_{i,j}$ be defined to be the product probability that gives x the marginal distribution it has under Q_i and y the marginal distribution it has under Q_j. We assume that

$$\mathrm{E}_1 K(x, y) - \mathrm{E}_{i,j} K(x, y) > 0 \tag{1}$$

for all i, j. This assumption will legitimize the application of a large deviation bound for additive functionals of finite state Markov chains in the proof of Lemma 1, since the total length of all gaps is small compared to the number of aligned pairs and hence essentially all terms forming the additive functionals have negative expectation. (However, the alternative suggestion to apply the Azuma–Hoeffding inequality does not work.)

For Theorem 3 a convenient condition will involve computations that build on the parameter θ^*. Thus, for example, we define

$$\psi_y(\theta, \eta) = \log \mathrm{E}_0\big[\exp\{\theta K(x, y_1) + \eta K(x, y_2)\}\big],$$

with y_1, y_2 independent copies of y. Note that θ^* is the unique positive solution of the equation

$$\psi_y(\theta, 0) = 0.$$

Under the additional assumption that

$$\mathrm{E}_{1,0} K(x, y) = \mathrm{E}_0\big[\exp\{\theta^* K(x, y_1)\} K(x, y_2)\big] < 0,$$

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