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Proteomics

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Exercises 9

1. Protein ambiguity groups

Given 5 proteins A, B, C, D, E, each of which contains several identified peptides (1,2,3,...,8)

A: 1,2,3,4,5 B: 1,2,3,4 C, 2,3,4,5,6 D: 6,7,8 E: 5,6

Which proteins are distinct from D?

Which are differentiable from A?

2. ProteinProphet (Multiple choice with single answer)

Assume PeptideProphet computes three scores for 3 PSMs A, B, C: 0.6,0.7,0.92. A,B,C correspond to the same peptide TPEVDDEALEK, which is contained in protein LACB_ BOVIN. Which value will be used by ProteinProphet as the probability that a peptide assignment corresponding to the protein LACB_ BOVIN is correct?

- 0.7
- 0.92
- 0.74
- 0.6

3. ProteinProphet 2

Assume protein A contains 3 identified peptides X, Y, Z. X, Y are unique and only peptide Z is shared by another protein B. In protein B, Z is found as the only identified peptide. The weight w_A^Z is computed as 0.2 by learning the model. If p(+|D, NSP = 0) for peptide Z is calculated as 0.6, what is the probability that protein B is present in the sample?

Based on the overall NSP distribution, the probability p(+|D, NSP) for peptide X, Y, Z in Protein A is 0.6,0.9,0.3, what is the probability that protein A is present in the sample?

4. ProteinProphet 3

Given a protein A that contains 3 identified peptides X, Y, Z. The best PeptideProphet estimates of X, Y, Z are 0.6, 0.7, 0.9, respectively. What is the number of sibling peptides (NSP) for peptide X? How about the NSP for peptide Y?

5. Inference through quantification 1

The relative abundance ratio of peptides A,B,C,D is 1.9, 1.4, 1.02, 1.04, respectively. If protein Z is supported by two distinct peptides C and D.

Then the relatice abundance ratio of protein Z is

6. Inference through quantification 2 (Multiple choice with single answer)

Protein X is quantified by three identified peptides A, B, C in a quantification experiment. B and C are also contained in protein Y and Z. The relative abundance ratio of peptides A,B,C is 1.9, 1.4, 1.02. What is the relatice abundance ratio of protein X?

- 1.21
- 1.44
- 1.9
- 1.4

7. MAYU for Protein FDR estimates

Assmue there are 20 protein entries input and 5 target, 5 decoy protein identifications are found in the end. what is the MAYU FDR for the 5 target protein IDs?