

8 Exercises – Multiple sequence alignment

1. SP score

The SP (sum-of-pairs) score is used to evaluate multiple sequence alignments.

$$S(\mathcal{A}) = \sum_{i=1}^{m-1} \sum_{j=i+1}^m S(\bar{s}^i, \bar{s}^j)$$

Use the simple scoring scheme and the alignment \mathcal{A} to answer the following questions.

Alignment \mathcal{A} :

Seq1: A-G

Seq2: GCG

Seq3: G-T

Scoring scheme:

$R_{ab} = 1$ for $a = b$

$R_{ab} = 0$ for $a \neq b$

$g = 1$

N.B. The score of a column with two blanks in a pairwise alignment should be 0.

(a) Calculate the pairwise score $S(\bar{s}^1, \bar{s}^2)$.

(b) Calculate the pairwise score $S(\bar{s}^1, \bar{s}^3)$.

(c) Calculate the pairwise score $S(\bar{s}^2, \bar{s}^3)$.

(d) Calculate the SP score $S(\mathcal{A})$.