Bioinformatics I
WS 15/16
Tutor: Alexander Seitz

1	2	3	4	$\sum$ (7)

Jonas Ditz
& Benjamin Schroeder

Assignment 5

(Handed in 16. November 2015)

Theoretical Assignment - *Comparison with at most l mismatches*

General we are now only looking at the worst case scenario, which means uniform distributed mistmatches in an alignment. Also we only look at $k >= 1$, as $k = 0$ is in our application not a useful result. Assume two sequences of length t with l mismatches.
Than both sequences contain l tuples of length $\lfloor \frac{t}{l+1} \rfloor$ and one tuple which has a length of maximal $\lfloor \frac{t}{l+1} \rfloor$. Where $k = \lfloor \frac{t}{l+1} \rfloor$ is the maximal tuple length, possible in both sequences.

So both sequences share $l + 1$ k-tuples and for each $k \leq \lfloor \frac{t}{l+1} \rfloor$ they share $(l + 1) * \lfloor \frac{\lfloor \frac{t}{l+1} \rfloor}{k} \rfloor$ k-tuples.

Theoretical Assignment - *Linear programming by hand*

The feasible region of this linear program is shown in figure 1, where the red line is constraint 1, green line is constraint 2, constraint 3 is drawn as a blue line and the yellow line is constraint 4.

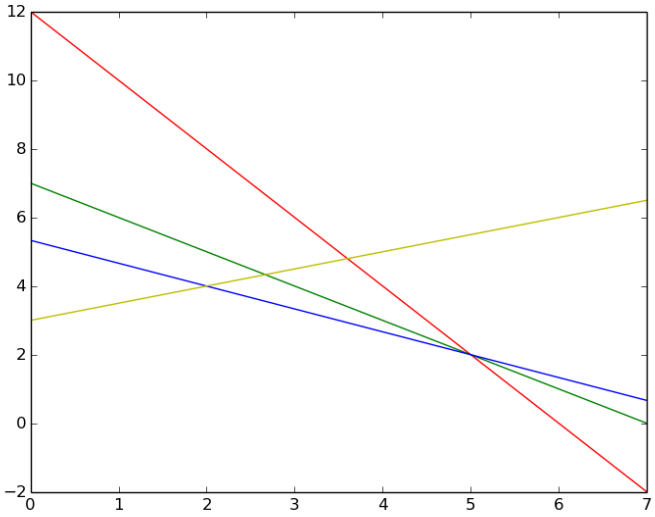

Figure 1: feasible region of linear program

Theoretical Assignment - *Bonus: Carillo-Lipman bound*