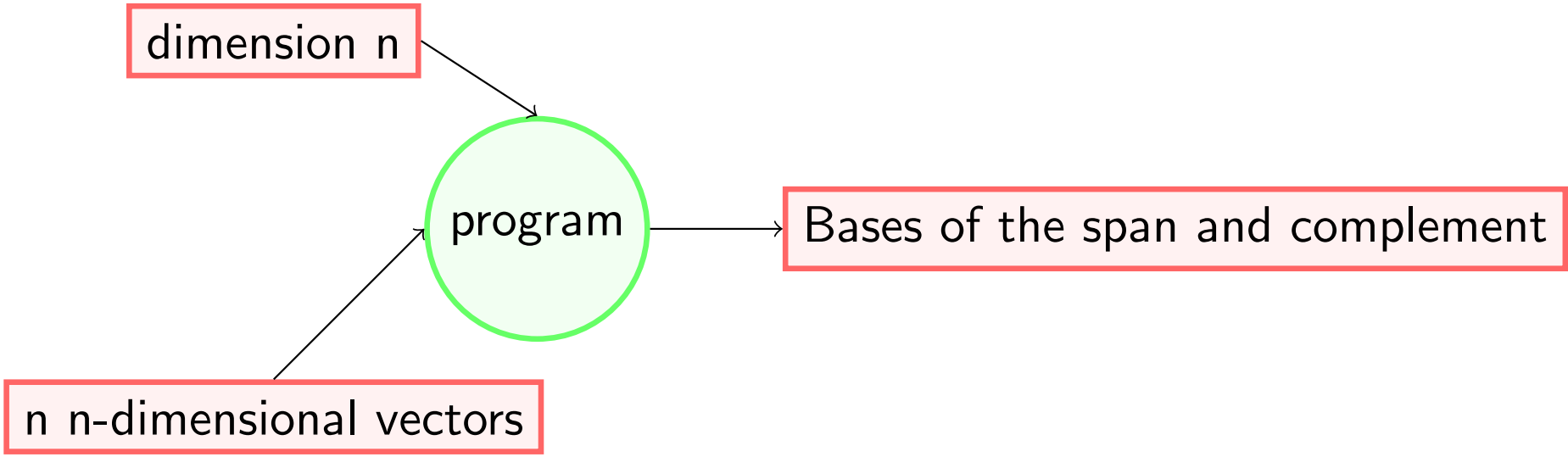
Complement of a subspace and adapted bases

Tilman Jacobs, Sandro Reinhard

June 6, 2023

Our projects aim was to create a program fulfilling the purpose outlined in the schematic below.



The basis of a vectorspace is a minimal family of linearly independent vectors that spans the entire space.

To find a basis B_{V^c} of a complement of a vector subspace $V \subset \mathbb{R}^n$ we take one of its bases B_V and append to it the required vectors to complete it to a basis B of $\mathbb{R}^n$. If we then extract all vectors $v \in B \cap B_V$ we obtain a $B_{V^c} = B \setminus B_V$.

The *input*() function prompts the user to input a varible into the program.

$$n = int(input())$$

The *append*() function adds an object to another pre-existing object.

$$list_2 = list_1.append(x)$$

A for-loop is a function that repeatedly executes a piece of code using a list of values.

$$for\ i\ in\ list:\ \ function(i)$$

An *if*(−*else*) statement executes a piece of code contingent on a set of conditions being met. The *else* part of the statement provides code to be run if the *if*-condition is not met

if condition :

option 1

else :

option 2