

**problem 18**

Look at words in which A doesn't appear until after a B.

(This is not the same as the one I did in class. That one was about words in which A can't appear after a B -- here, A's can't appear before a B)

For example, C X D B C Z A is a good 7-word

Z A Q B D is a BAD 5-word

A A A A A is a BAD 5-word

B C D B is a good 4-word

Let  $u_n$  be the number of good words of length  $n$

Find a recurrence relation for  $u_n$  and find IC.

**solution 18**

A good string of length  $n$  must be one of the following types.

- (1) B followed by any  $(n-1)$ -word
- (2) C-Z (i.e., not A and not B) followed by a good  $(n-1)$ -word  
(A good string can't start with an A.)

The number of strings of type (1) is  $26^{n-1}$

The number of strings of type (2) is  $24u_{n-1}$

$$\text{So } u_n = 24u_{n-1} + 26^{n-1}$$

This is a first order rr. So I need one IC.

The good words of length 1 are B, ..., Z so  $u_1 = 25$