Goals

To give you practice working with finite state machines and thinking about these as an example of a model of language: what does a particular FSM predict about the language and why is the model designed the way it is?

Exercise 4

In lecture 3, there was an example of English derivational morphology based on the word *word*. The FSM below implements a fragment of English morphology that looks like this and generates words like *wordy, wordification*, etc. (assuming that spelling changes are fixed up by another FSA that applies afterward).

- The example only includes a single stem, *word*, on the first transition arc. List three other stems that could go there. What kinds of words
can't go there?

b) Consider the transitions labeled er, ism, ist. All of these end up in states labelled N (noun). What would happen if we removed the bottom two noun states and made these transitions end up in the same state where the word transition ends? Give some examples of words that are generated. Do these seem like possible words of English to you? (You might have different judgments than other people!)

Exercise 5

The transducer from J&M Fig 3.17 is reproduced below. (‘other’ = none of \{z,s,x,^,#,\epsilon\}).

a) What sequence of states would we go through to create the correct plural form for axle^s#?

b) What about for lass^s#?

c) Can you think of any words that cause the transducer to go from state $q_2$ to $q_5$ and then continue on to an accepting (end) state? If not, can you at least say what properties would such a word need to have?