Steman Population Model Exercise

The purpose of this exercise is to explore the nonlinear dynamics of a population system with a carrying capacity, when the birth and death rates respond to the ratio of population to carrying capacity but with a fixed delay.

Instructions:

Using the Vensim model *Poblacion Retraso.mdl*, complete the following:

Check the model for correct model (CNTL-T) and units (CNTL-U) specifications. If there are any specification errors, revise the model to eliminate them.

1) Run a "baseline" version of the model (named "Base") using the initial values. What kind of behavior (what fundamental behavior mode) is generated?
2) Change the value of the delays for FBR and FDR from 1 to 5. What change in behavior of the population do you observe? Is this a different fundamental behavior mode?
3) Change the value of the delays for FBR and FDR from 1 to 10. What change in behavior of the population do you observe? Is this a different fundamental behavior mode? Look at the graph for the flows (birth rate and death rate). How have these changed from the scenario when the delay time is 5?
4) Change the value of the delay for FBR to 10, but leave the value of the delay for the FDR at 1. How does this affect the behavior of the population? How are the behaviors of the birth and death rates different than when both delay values are 10?
5) What do the delays in this simple model do to the nature of the dynamics of population compared to the situation where there are no delays?