

Task 1: Simulating an exponential model

1. Open matlab
2. Type "simbiology" and press enter in the matlab command window
3. Click on "New" to create a new model
4. Press "Finish" to go into the simbiology workspace
5. Under the "Content" menu on the left, select your model under the "Project Workspace" menu, which for now is called "untitled"
6. Use the "Open" tab on the upper left and select "Diagram" under the "Model" menu
7. In the diagram window, drag one species and one reaction into the "unnamed" rectangular space.
8. Double click on "species_1" that you dragged over and enter a new name, called "x", hit enter and then close the window. Note: you need to double click inside the oval, not on the name.
9. Double click on "reaction_1" and rename it "exponential growth", hit enter but don't close. Note: you need to double click inside the circle, not on the name.
10. In the "ReactionRate" box type " $r*x$ " then hit enter and close
11. Option-click-drag an arrow from the growth reaction to the x species
12. Click on the "Table Overview" tab
13. Select the "Add Quantity" drop down menu in the middle of the screen and select "parameter"
14. In the "Name" box just to the right of that drop down menu, type "r" then hit enter
15. Double click on the value for the species "x" in the "Value" column and type "1", hit enter
16. Double click on the value for the parameter "r" in the "Value" column and type "0.05", hit enter
17. Click on the "Content" menu on the left and double click "Simulation (untitled)" under the "Project Tasks".
18. In the Task Editor-Simulation window, hit the green "Run" button
19. Click on the "Simulation Settings" button at the top of the screen
20. In the "StopTime" box, type in 100, then hit enter, and close
21. Hit the green "Run" button again
22. Control-click on the simulation plot, select "Export to Figure"
23. Click on the "Edit" menu, select "Axes Properties..."
24. Edit the X Label box, enter "Time"
25. Select the "Y axis" button, type in "Population size in the "Y Label"
26. Select the "File" menu in the upper right, select "Save as"
27. Select .png as the format, edit the save name to "exponential growth", save the figure
28. Go back to the main Simbiology window, select the "Home" tab.
29. Click on the "Save" button in the upper left
30. Save the project file as "growth models"

Task 2: Simulating a logistic growth model

1. In the "Home" tab, click on the "Add Model" button, select "Create New Blank Model..."
2. Edit the model name to "Logistic model", click ok
3. Use the "Open" tab on the upper left and select "Diagram" under the "Model" menu
4. In the diagram window, drag one species and one reaction into the "unnamed" rectangular space.
5. Double click on "species_1" that you dragged over and enter a new name, called "x", hit enter and then close the window. Note: you need to double click inside the oval, not on the name.
6. Double click on "reaction_1" and rename it "logistic growth", hit enter but don't close. Note: you need to double click inside the circle, not on the name.
7. In the "ReactionRate" box type " $r*x*(1-x/K)$ " then hit enter and close. Note: use a capital "K"
8. Option-click-drag an arrow from the growth reaction to the x species
9. Click on the "Table Overview" tab
10. Select the "Add Quantity" drop down menu in the middle of the screen and select "parameter"
11. In the "Name" box just to the right of that drop down menu, type "r" then hit enter
12. In the "Name", type "K" then hit enter
13. Double click on the value for the species "x" in the "Value" column and type "1", hit enter
14. Double click on the value for the parameter "r" in the "Value" column and type "0.05", hit enter
15. Double click on the value for the parameter "K" in the "Value" column and type "100", hit enter
16. Click on the "Add task" button and select "Simulate model"
17. In the Task Editor-Simulation window, hit the green "Run" button
18. Click on the "Simulation Settings" button at the top of the screen
19. In the "StopTime" box, type in 100, then hit enter, and close
20. Hit the green "Run" button again
21. Click on the "Simulation Settings" button at the top of the screen
22. In the "StopTime" box, type in 500, then hit enter, and close
23. Hit the green "Run" button again
24. Control-click on the simulation plot, select "Export to Figure"
25. Click on the "Edit" menu, select "Axes Properties..."
26. Edit the X Label box, enter "Time"
27. Select the "Y axis" button, type in "Population size in the "Y Label"
28. Select the "File" menu in the upper right, select "Save as"
29. Select .png as the format, edit the save name to "logistic growth", save the figure
30. Go back to the main Simbiology window, select the "Home" tab.
31. Click on the "Save" button in the upper left

