2:

Q:Is the expected value of the in-degree the same for every node in an ER graph? Please answer yes or no and include a short explanation for your answer.

A:Yes. The expected value of the in-degree is (n - 1) \* p.

Q:What does the in-degree distribution for an ER graph look like? Provide a short written description of the shape of the distribution.

A: Follow the law of large numbers, the in-degree distribution for an ER graph looks like standard normal distribution.

Q:Does the shape of the in-degree distribution plot for ER look similar to the shape of the in-degree distribution for the citation graph?

A:They are totally different. The shape of the in-degree distribution plot for ER look a bell while the in-degree distribution for the citation graph only has the right half.

3:

Q: For this question, provide numerical values for n and m that you will use in your construction of the DPA graph.

for n and m that yield a DPA graph whose number of nodes and edges is roughly the same to those of the citation graph. a good choice for m is an integer that is close to the average out-degree of the physics citation graph.

A: n = 27770, m = round(12.7) = 13

5:

Q: Is the plot of the in-degree distribution for the DPA graph similar to that of the citation graph? Provide a short explanation of the similarities or differences. Focus on the various properties of the two plots as discussed in the class page on "Creating, formatting, and comparing plots".

A: Yes , they are similar to each other.

Q: Which one of the three social phenomena listed above mimics the behavior of the DPA process? Provide a short explanation for your answer.

A: The "rich gets richer" phenomenon mimics the behavior of the DPA process.

Q: Could one of these phenomena explain the structure of the physics citation graph? Provide a short explanation for your answer.

A:I think the "rich gets richer" phenomenon can also explain. But when referring papers, it’s not rich, but how breakthrough it is. If a paper create a new field and become a fundamental of this field, it is very likely to be cited by this field papers. So does those famous authors.