Fractals and Scaling (2020)

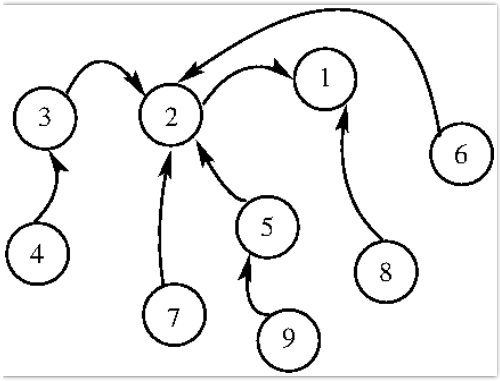
6.10 Test » Test for Unit 6

Instructions 1

You may use any course materials, websites, calculators, etc. for this test. Just don't ask another person for the answers or share your with other people. If you have questions about the test, please send them to us via email.

Question 2

Consider a network that is growing according to the preferential attachment model described in the lectures and homework. The figur shows a network that, at this stage of growth, has 9 nodes.



Suppose a new node is formed and it links to an existing node at random. What is the probability that the new node links to node 6?

- A. 0
- B. 1/10
- C. 1/9
- D. 1/6

Question 3

Referring again to situation shown in problem one, suppose now that a new node is created and this node links to an existing node with proportional to the number of in-links that node has. What is the probability that the new node links to node 1?

- A. 1/9
- B. 1/8
- C. 1/4
- D. 1/2

Question 4

Referring again to situation shown in problem one, suppose now that a new node is created and this node links to an existing node with proportional to the number of in-links that node has. What is the probability that the new node links to node 6?

- A. 0
- B. 1/8
- C. 1/4
- D. 1/2

Question 5

Suppose the random variable X is the product of a large number of other random variables y, where y is positive and has finite variance. distribution would describe the random variable X?

- A. A power law distribution
- B. An exponential distribution
- C. A log-normal distribution
- D. None of the above

Question 6

Now suppose the random variable Z is the product of a large number of other random variables y, where y is positive and has finite vari multiplicative process is modified in some way so that there is a lower threshold. That is, there is a non-zero minimum for Z. What dis would describe the random variable Z?

- A. A power law distribution
- B. An exponential distribution
- C. A log-normal distribution
- D. None of the above

Question 7

Suppose there are a large number of variables x, each of which grows exponentially at the same rate. The ages of these random variab exponentially distributed. That is, the time t for which these random variables has been growing is exponentially distributed. What dist would describe the random variables x?

- A. A power law distribution
- B. An exponential distribution
- C. A log-normal distribution
- D. None of the above

Question 8

True or False: There are many different mechanisms that generate power laws.

- A. True
- B. False