離散數學第一次小考 (範圍:ch1 & ch2) 授課老師：鍾國亮教授

日期:2010/10/4(一)

1. (10 points) What is the number of nonnegative integer solutions of ()?
2. (10 points) Cynthia has 9 classmates in a computer programming class. For the final project as teamwork, in how many ways can she team up with two or more of them?
3. (10 points) Solve

, n is even.

1. (10 points) Let Ax = {a, b, c, d, e}, Px ={1/2, 1/4, 1/8, 1/16, 1/16}, and consider the code *C*(a) = 0, *C*(b) = 10, *C*(c) = 110, *C*(d) = 1110, C(e) = 1111. Please find the expected length *L(C)* of this code.
2. (10 points) Derive the expectation value and the variance of the Bernoulli distribution.

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日期:99/10/4

1. 令 ,

則

共有 = 816種

1. Cynthia至少和兩位同學一組的方法數有: = 512 - 1 - 9 = 502種
2.  (當n為偶數)
3. 令l(i)為c(i)的長度及p(i)為i出現的機率,i=a,b,c,d,e

則l(a)=1, l(b)=2, l(c)=3, l(d)=4, l(e)=4

P(a)= P(b)= P(c)= P(d)= P(e)=

故編碼長度*L(C)*的期望值:

*L(C)*

=++++

=

5. 從伯努利分佈的介紹中, 伯努利分佈被定義為：



根據上式,伯努利分佈的期望值為：



根據變異數的定義, 伯努利分佈的變異數為



求得伯努利分佈的變異數後, 根據標準差的定義, 很自然可得到伯努利分佈的標準差為

