Révision intra*

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*Ross : page du manuel en français – Davignon : pdf

1 Chapitre 5 : Variables aléatoires continues

1.1 Ross auto-évaluation 5.6 p. 281

5.6. Your company must make a sealed bid for a construction project. If you succeed in winning the contract (by having the lowest bid), then you plan to pay another firm \$100,000 to do the work. If you believe that the minimum bid (in thousands of dollars) of the other participating companies can be modeled as the value of a random variable that is uniformly distributed on (70, 140), how much should you bid to maximize your expected profit?

1.2 Ross problème 5.22 p. 273

5.22. Every day Jo practices her tennis serve by continually serving until she has had a total of 50 successful serves. If each of her serves is, independently of previous ones, successful with probability .4, approximately what is the probability that she will need more than 100 serves to accomplish her goal?
Hint: Imagine even if Jo is successful that she continues to serve until she has served exactly 100 times. What must be true about her first 100 serves if she is to reach her goal?

1.3 Davignon exercice 5.7 p. 124

EXERCICE 5.7. Réaliser 1000 lancers d'un dé équilibré. Calculer une approximation de la probabilité que le 6 apparaisse entre 150 et 200 fois inclusivement. Sachant que le 6 est apparu 200 fois, quelle est la probabilité que le 5 apparaîtra moins de 150 fois ?

1.4 Davignon exercice 5.4 p. 123

EXERCICE 5.4. Les trains à destination de Québec arrivent à intervalle de 15 minutes à partir de 7h. Les trains à destination de Toronto arrivent aussi à la gare à intervalles de 15 minutes, mais à partir de 7h 05.

(a) Si une certaine voyageuse arrive à la gare à un moment aléatoire distribué uniformément entre 7h et 8h et qu'elle prend le premier train arrivé, quelle est la probabilité qu'elle se rende à Québec ?

(b) Et si elle arrive à un temps uniformément distribué entre 7h 10 et 8h 10 ?

2 Chapitre 4 : Variables aléatoires

2.1 Ross problème 4.29 p. 212

4.29. There are two possible causes for a breakdown of a machine. To check the first possibility would cost C_1 dollars, and, if that were the cause of the breakdown, the trouble could be repaired at a cost of R_1 dollars. Similarly, there are costs C_2 and R_2 associated with the second possibility. Let p and $1 - p$ denote, respectively, the probabilities that the breakdown is caused by the first and second possibilities. Under what conditions on $p, C_i, R_i, i = 1, 2$, should we check the first possible cause of breakdown and then the second, as opposed to reversing the checking order, so as to minimize the expected cost involved in returning the machine to working order?
Note: If the first check is negative, we must still check the other possibility.

2.2 Davignon exercice 4.8 p. 91

EXERCICE 4.8. On suppose que pour condamner un.e accusé.e, il faut le vote de 9 des 12 membres d'un jury. La probabilité qu'un.e juré.e croie à l'innocence d'un.e coupable est de 20% [18] , tandisque la probabilité qu'un.e juré.e croie à la culpabilité d'un.e innocent.e est de 10%.

Si chaque juré.e est indépendant.e et la probabilité qu'un.e accusé.e soit effectivement coupable est de 65%, quelle est la probabilité que le jury rende la bonne décision ?

3 Chapitre 3 : Probabilité conditionnelle et indépendance

3.1 Ross auto-évaluation 3.13 p. 144

3.13. Balls are randomly removed from an urn that initially contains 20 red and 10 blue balls.

(a) What is the probability that all of the red balls are removed before all of the blue ones have been removed?
Now suppose that the urn initially contains 20 red, 10 blue, and 8 green balls.

(b) Now what is the probability that all of the red balls are removed before all of the blue ones have been removed?

(c) What is the probability that the colors are depleted in the order blue, red, green?

(d) What is the probability that the group of blue balls is the first of the three groups to be removed?