HW Week 1

5(a). $$\frac{2050}{12} = 170.8333 \approx 171$$

(b). $$\left(\frac{n}{171} \pm \frac{2\sqrt{n}}{171}\right)12$$

$$\underline{\underline{1764 \text{ to } 2388}}$$

(c). $$\frac{171}{\lambda} \pm \frac{2\sqrt{171}}{\lambda}$$

(d). No idea, couldn't find in textbook

6(a). show $EN_t = \lambda t$

$$\sum_{n=0}^{\infty} n \cdot \frac{e^{-\lambda t}(\lambda t)^n}{n!} = \lambda t$$

$$\lambda t \sum_{n=0} \frac{e^{-\lambda t}(\lambda t)^{n-1}}{(n-1)!} = \lambda t$$

$$\lambda t(1) = \lambda t$$

$$\lambda t = \lambda t \checkmark$$

show $VN_t = \lambda t$

$$\sum_{n=0}^{\infty} n^2 \frac{e^{-\lambda t}(\lambda t)^n}{n!} = \lambda t$$

$$\sum_{n=0} n \frac{\cdots}{n!} = \lambda t$$

$$\lambda t \sum_{n=0}^{\infty} n \frac{e^{-\lambda t}(\lambda t)^{n-1}}{(n-1)!} = \lambda t$$

$$\cancel{(\lambda t)^2} + (\lambda t) - \cancel{(\lambda t)^2} = \lambda t$$

$$\lambda t = \lambda t \checkmark$$

(b). $P(18) = \dfrac{e^{-171}(171)^{18}}{18!}$

using R: dpois(18,171) $\approx \underline{\underline{0}}$

(c). $.95(18) = 17.1$

$\sqrt{17.1} = 4.1$

$\underline{\underline{13.9 \text{ to } 22.1}}$

(d). The exact method would give a more precise answer. For a single day the exact method would be better. However, for a year it would be better to be more general.

11(a). The optimal flight path is high because the bombers have less possibility of being hit.

(b). $.70^{16} = \underline{\underline{.0033}}$

(c). No idea

(d). The probability that the bomber can destroy the target is very sensitive.

(e). The other side gains an advantage in bad weather.

References

Vinnedge, Anna CDT E2 '22. Assistance to the author written communication. CDT Vinnedge discussed some of the general methods for solving some of these problems, specifically how to solve the poisson equations. 26 MAR 2020.