



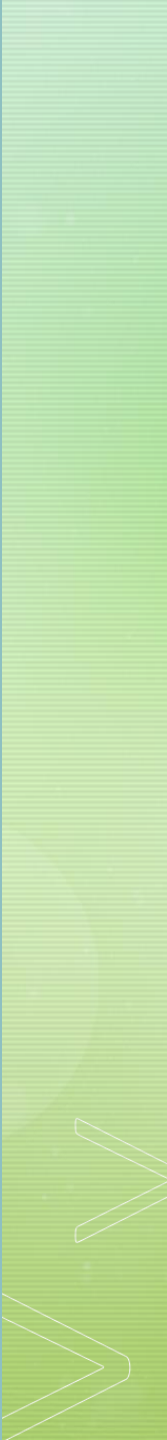
Problem C

By: Kai Burgman, Turner Zischka, and Courtney Loomis

US Military Academy, West Point NY



Assumptions and Frame

- No female butterfly will die over this time frame and the population will remain constant.
 - The environmental factors are dependent upon the level of anaphrodisiac, determined upon a specific environment.
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Variables

- Independent Variable: t , time in number of days
- Dependent Variables: α , represents the population of successful eggs

Parameters

- **Parameter:**
 - E, the percent likelihood of survivability within the environment. The quality, size, and species of leaves available to lay eggs. E represents the environment factor within the equation.
 - W is the percent of the population that will be consumed by wasps. W represents the predatorial factor.
 - X, population of female *Pieris Brassicae*

Model

$$\alpha = 45 \cdot E \cdot W \cdot X \cdot t$$

This equation models the successful hatching of eggs by the number of females within the environment. The predatorial and environmental factor will lower the ideal value to match the actual successful offspring. The units of the equation will be in the number of eggs and the constants E and W will be based on the average amount of anti-aphrodisiac produced by male butterflies during mating.



New Assumptions

- A wasp has one chance to kill eggs, when it hitches a ride on the female

New assumptions

- Birds eat Wasps and Butterflies
- $\alpha = 45(X - gb)E(1 - \frac{(AAjw - eb)k}{45x})t$
- Redefinition of W
 - AA, concentration of Anaphrodisiac
 - j, constant coefficient mediating how many wasps show up.
 - e, constant coefficient, wasp eaten per bird. (should be a logistics
 - K, eggs killed per wasp integrations
 - w, Number of wasps in the environment
 - G, rate at which birds eat butterflies