

Review Form 1.7

Journal Name:	Journal of Advances in Mathematics and Computer Science
Manuscript Number:	Ms_JAMCS_111022
Title of the Manuscript:	Probabilistic Population Modeling with Interactions between Species
Type of the Article	Original Research Article

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<p>Compulsory REVISION comments</p> <ol style="list-style-type: none"> 1. Is the manuscript important for scientific community? (Please write few sentences on this manuscript) 2. Is the title of the article suitable? (If not please suggest an alternative title) 3. Is the abstract of the article comprehensive? 4. Are subsections and structure of the manuscript appropriate? 5. Do you think the manuscript is scientifically correct? 6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form. <p><u>(Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)</u></p>	<p>Section 1- Conditions, Assumptions, and Parameters for Probabilistic Model:</p> <p>Suppose $x(t)$ and $y(t)$ are the populations of two species at time t, and to find the probability distributions of these populations at time $(t, t + \Delta t]$ will accept the following axioms:</p> <p>Axiom 1: The probability that the incidence of species $x(t)$ will be killed by the predator $y(t)$ in a very short time interval is directly proportional to:</p> <ol style="list-style-type: none"> i) the length of the interval Δt; ii) the predator – prey population densities. <p>Let alpha α be a constant of proportionality, then the probability of reproduction of m-individual is</p> $p_m = p[\text{one birth in } \Delta t \text{ for } x(t) = m] = \alpha \cdot m \cdot \Delta t < 1$ <p>and $p_n = p[\text{one reproduction of } y(t) = n \text{ individuals}] = \beta \cdot n \cdot \Delta t < 1$</p> <p>Notice that: α is the growth rate of one individual of x in a unit of time and β is the rate on one reproduction of predator y in a unit of time.</p> <p>Axiom 2: The probability that there is exactly one kill-contact between predator and prey in a very short period of time is proportional to the number n of the predators and m preys at time t and the length of the interval, $p[\text{one contact during } (t, t + \Delta t)] = \gamma \cdot p_m \cdot p_n \cdot nm \cdot \Delta t < 1$</p> <p>Axiom 3: Prey uses natural resources to grow, and prey is the only resource of food available for predators. When the kill-contact between prey and predator happens, the prey population will be reduced from m to $m - 1$.</p> <p>Axiom 4: We will take time increment (Δt) sufficiently small, so that no individual can have more than one event like incidence to kill or reproduce one individual during that time interval $(t, t + \Delta t]$.</p> <p>Axiom 5: The probability of more than one kill-contact, or one contact and one birth, is negligible.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. By axiom 1, the probability of no birth prey during $(t, t + \Delta t]$ is $p[\text{no birth for prey } x(t) = m] = 1 - \alpha \cdot m \cdot \Delta t$ By the same reason for the probability of no offspring during the time interval $(t, t + \Delta t]$ for predator is $p[\text{no offspring for predator } y(t) = n] = 1 - \beta \cdot n \cdot \Delta t$ 2. In a more complicated model one may assume that the probability of one birth of predator is proportional to the probability density of prey population at time t, that is in Axiom 1 there 	Noted

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	<p>can be</p> $p[\text{one reproduction of predator}] = \beta \cdot \cancel{p_m(t)} \cdot n \cdot \Delta t$ <p>3. Probability of kill-incidence in small time interval is = $\gamma \cdot p_m(t) \cdot p_n \cdot \Delta t$</p> <p>4. Probability of no kill-incidence in small time interval is = $1 - \gamma \cdot p_m(t) \cdot p_n \cdot \Delta t$</p>	
<p>Minor REVISION comments</p> <p>1. Is language/English quality of the article suitable for scholarly communications?</p>		
<p>Optional/General comments</p>		

PART 2:

	<p>Reviewer's comment</p>	<p>Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</p>
<p>Are there ethical issues in this manuscript?</p>	<p>(If yes, Kindly please write down the ethical issues here in details)</p>	