

School of Engineering and Applied Science (SEAS), Ahmedabad University

**B.Tech(CSE) Semester IV: Probability and Stochastic Processes (MAT 277)**

- Group No : BB14
- Group Members :  
Jinesh Salot (AU1940178), Kathan Shah (AU1940152), Nipun Patel (AU1940033), Poojan Gandhi (AU1940125), Rohan Parikh (AU1940157), Samkit Kundalia (AU1940021), Tirth Patel (AU1940137)
- Project Title:

**1 Justify how probabilistic model/PSP concept is used in your project. How uncertainty is modeled?**

The project objective was to estimate the number of live births and fetal losses could occur in a given span of time. In order to do this, we have used probability concepts like *Binomial Theorem*, *Multinomial Theorem*, *Probability Distribution Functions*, *Cumulative Distribution Functions* and *Poisson Distribution*.

**Uncertainties**

Pregnancy outcomes are uncertain in nature, that depend on a lot of factors like: coital frequency, susceptibility, probability of conception, use of contraceptives, probability of fetal loss, fecundability and length of menstrual cycle etc.

To ascertain the Conception Probability - we modelled it as a Binomial Random Variable. We considered the probability of fetal losses to be fixed by deciding the mortality rate for the fetuses in order to find the pregnancy leading to Live Birth for different intervals of time . We also found the mean interval of months, that is the difference between two live births for the total period of 10,15 years etc.

Probability of conception in a fertile time follows geometric distribution

We were able to model the probability of  $r$  numbers of live births given the probability of fetal mortality over the span of  $t$  years.

## 2 Clearly enlist the new things done in the coding part, excluding the shared code. [If no new code is written/added/modified, then please write NA]

1. Modelled probability of conception which previously the author had taken constant. We did it using concepts of conditional probability and binomial random variables.
2. Used coital frequency, number of fertile days, coital frequency between fertile days and days of intercourse occurred in fertile period as parameter to find probability of conception which was taken constant by author previously.
3. Tuned the authors model to find the probability of exactly r fetal loss in a period of y years.
4. TOBEDONE

## 3 Contribution of team members

### 3.1 Technical contribution of all team members

Enlist the technical contribution of members in the table. Redefine the tasks (e.g Task-1 as simulation of fig.1 and so on)

Tasks	Jinesh Salot	Kathan Shah	Nipun Patel	Poojan Gandhi	Rohan Parikh	Samkit Kundalia	Tirth Patel
Task-1							
Task-2							
Task-3							

### 3.2 Non-Technical contribution of all team members

Enlist the non-technical contribution of members in the table. Redefine the tasks (e.g Task-1 as report writing etc.)

Tasks	Jinesh Salot	Kathan Shah	Nipun Patel	Poojan Gandhi	Rohan Parikh	Samkit Kundalia	Tirth Patel
Task-1							
Task-2							
Task-3							

#### 4 Any innovation done considering the society/neighborhood problem?

#### 5 Enumerate the inferences derived from user-centric perspective.

We find the probability of conception using the length of the cycle, number of fertile days in that cycle, number of coital acts in that cycle as a factor. This will be useful to couples as using this they would be able to calculate the probability of conception when they use contraceptive.

We have calculated the mean number of months between two live births given the probability of conception (considering that the couple is using contraceptives) taking the mortality rate of fetuses as a factor. This would be useful to couples who use contraceptives and want to know the chances of the number of births of the child and also the time interval of birth between them even after using contraceptives.

Fetal Mortality Rate	Mean number of months between two livebirths
0%	114
10%	125.6
25%	148.7

1. Even after using the contraceptive, couples should at least expect 1 child as the expected values of births are 1.5, 1.4 and 1.2 for probability of fetal mortality=0,0.1,0.25.
2. For couples who want to have a child there is a 20% chance that over a 15 year period they will have 2 or 3 Stillbirths/Miscarriages.
3. By modelling the probabilities of r births in y years we can see that even using the contraceptive pills (thus reducing the probability of conception to 0.01) for a period of 10 years there is 0.6273 probability that at least 1 child is born.