

# Compound-Complex Problem: A Study of Mathematical Salvation To Language

Narayan Guchhait

Research Scholar,

Jharkhand Rai University, Ratu, Ranchi, India

Email Id: ngkaku001@gmail.com

DOI: 10.29322/IJSRP.9.04.2019.p8808

<http://dx.doi.org/10.29322/IJSRP.9.04.2019.p8808>

**ABSTRACT:** Sentences are the important part of human expression. There are different types of sentences like simple, compound, complex and compound-complex sentence. The last is comparatively more important than the first three sentences due to the making of long sentence by joining simply. The process of simplified joining sentences (compound-complex form) in Grammar are shown as the traditional way. The joining process can be shown in another process by the use of mathematical way. Marcov Chain, a stochastic process in Statistics is commonly regarded as branching process. In this mathematical process each event or incidence waves a number of corresponding events related to the principle. Thus a Marcov Chain consists with pace denoted by state,  $(0, 1, \dots, 1)$  and the set of positive integers. In the Marcov Chain the first state is regarded as a recurrent state and other finite sets are treated as transient state because the state makes a transitional form from one neighbouring state to another whereas in the recurrent state  $i=1$ . Marcov Chain in this paper for the sentence formation where numbers of simple sentences are changed to a single sentence is applied. Marcov Chain is a chain in which number of sentences / events are congregated with this process. The process is also called Marcov process. What is the role of Marcov process in the study of syntax? The process is a unique presentation of formation of a number of sentences into one. The aim of focusing of the process to the study of syntax is interesting to present a new approach. Now let us observe the analysis of syntax how enumerable events or sentences turn into one event. So I have observed that in the presence of joining of sentences the chain or Marcav process in followed its application to the joining of sentences shows how it is possible to analyse.

From the statistical point of view, there are two forms of sentences: one is closed sentence and the rest open sentence. Any sentence in general may be treated as both the closed sentence and open sentence. In this section I want to show how a sentence from the statistical point of view behaves like measurable components. Like components or things, it is possible to show that sentences can be measured or estimated. And at the same time we shall see how sentences with its several forms behave like measurable things. Actually it is an absolute idea by which sentence can be estimated. First of all we should clearly make out to do this that there are two sorts of Languages (language in general and language of infinitum) in which contains the elements of the particular sentence.

**Key Note: Compound-complex form, Marcov Chain, Branching Process, Recurrent State, Close and Open Sentence**

## a. Marcov Chain

**1.1 Introduction:** Marcov Chain known as a stochastic process in Statistics in which a wide variety of incidence or events are presented. This process of Marcov Chain is commonly regarded as branching process, too. In this mathematical process each event or incidence waves a number of corresponding events related to the principle. It is supposed that each event is extended to a new event  $j$  with probability  $P_j$ , where  $j \geq 0$  and where other incidence or events of the number are treated as independent. Now it is, also, assumed that  $P_j < 1$  for all  $j \geq 0$ . The number of subsidiary events present in given context, denoted by  $X_0$  that is the size of  $0^{\text{th}}$  event. All subsidiary events of the  $0^{\text{th}}$  events make the first representation or expression and their subsidiary events indicated by  $X_1$ . It is, of course, at the same time, assumed that  $X_n$  suggests the size of the  $n^{\text{th}}$  events and it follows  $\{X_n, n = 0, 1, \dots\}$ . Thus a Marcov Chain consists with pace denoted by state,  $(0, 1, \dots, 1)$  and the set of positive integers. In the Marcov Chain the first state is regarded as a recurrent state and other finite sets are treated as transient state because in this state  $i < 1$  and makes a transition from one neighbouring state to another whereas in the recurrent state  $i = 1$ . I introduce Marcov Chain in this chapter for the sentence formation where number of simple sentences are changed to a single sentence. To make out easily I use five simple sentences into one showing how the finite or countable number of possible values would be. It is finite or countable number for it represents 5 states as 1, 2, 3, 4 and 5.

Now it is discussed on Marcov Chain, a chain is number of sentences / events congregated with this process. The process is called Marcov process. What is the role of Marcov process in the study of syntax? The process is a unique presentation of formation of a number of sentences into one. The aim of focusing of the process to the study of syntax is interesting to present a new approach. Now let us observe the analysis of syntax how enumerable events or sentences turn into one event. So I have observed that in the presence of joining of sentences the chain or Marcav process in followed its application to the joining of sentences shows how it is possible to analyse. To present to process I here point into 5 simple sentences assumed as five distinctive events gives in below:

**1.2 Example –  $Mc_1$**

- He was poor.* ----- I
- He was weak* ----- II
- He stood by his friend.* ----- III
- This friend was in danger.* ----- IV
- He had none else to help him.* ----- V

After assimilation or joining of five sentences into one we get -

**To help his friend || in danger || being poor || and weak || he stood by || for he had none else.**

The combination consists in the following like

$$5 \rightarrow 4 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 5$$

Now this expression can be presented the following table:

Set of sentence	V→IV	IV→I	I→II	II→III	III→V
No. of State	1	2	3	4	5
Value of each state	1	1	1	1	1

**1.3. Solution:** And after arranging the given chart into Matrix we get a **Transitional Matrix  $R_1$**  that is mentioned in below:

Transitional form of the sentence

$$\begin{pmatrix}
 1 & 0 & 0 & 0 & 1/2 \\
 2 & 1/2 & 0 & 0 & 1/2 \\
 3 & 1/2 & 1/2 & 0 & 0 \\
 4 & 0 & 1/2 & 1/2 & 0 \\
 5 & 0 & 0 & 1/2 & 0
 \end{pmatrix}
 \begin{matrix}
 1/2 \\
 0 \\
 0 \\
 0 \\
 1/2
 \end{matrix}
 =
 \begin{matrix}
 1 \\
 1 \\
 1 \\
 1 \\
 1
 \end{matrix}$$

1      1      1      1      1

$P_1$

We shall now approach the given matrix into the ways of multiplication obtaining result --

$$P_2 = P_1 \times P_1$$

We get result of  $P_2$  matrix from the multiplication of the initial matrix  $P_1$  after reaching to a single step

$$\begin{pmatrix}
 0 & 1/4 & 2/4 & 0 & 1/4 \\
 0 & 1/4 & 1/4 & 1/4 & 1/4 \\
 1/4 & 0 & 0 & 2/4 & 1/4 \\
 1/4 & 1/4 & 0 & 1/4 & 0 \\
 1/4 & 1/4 & 1/4 & 0 & 1/4
 \end{pmatrix}$$

$P_2$

After approaching of two steps by multiplication what we get result from the matrix  $P_2$  is  $P_4$

That is  $P_4 = P_2 \times P_2$

$$\begin{pmatrix}
 3/16 & 2/16 & 2/16 & 5/16 & 4/16 \\
 4/16 & 3/16 & 2/16 & 4/16 & 3/16 \\
 4/16 & 4/16 & 3/16 & 2/16 & 2/16 \\
 2/16 & 4/16 & 5/16 & 2/16 & 2/16 \\
 2/16 & 3/16 & 4/16 & 3/16 & 4/16
 \end{pmatrix}$$

$P_4$

After reaching of five steps we get  $P_5$  Matrix mentioned in below:-

$$\begin{pmatrix}
 4/32 & 7/32 & 9/32 & 5/32 & 7/32 \\
 5/32 & 6/32 & 7/32 & 7/32 & 7/32 \\
 7/32 & 5/32 & 4/32 & 9/32 & 7/32 \\
 9/32 & 7/32 & 5/32 & 6/32 & 5/32 \\
 7/32 & 7/32 & 7/32 & 5/32 & 6/32
 \end{pmatrix}$$

$P_5$

**1.4. Solution:** After that we approach to explain the given composition in the **Steady State Probability** in the Markov Chain.

And from this calculation in the steady state probabilities what we obtain as result in that –

$$\pi_1 \pi_2 \pi_3 \pi_4 \pi_5 \begin{bmatrix} 0 & 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & 0 & 0 & \frac{1}{2} & 0 \\ \frac{1}{2} & \frac{1}{2} & 0 & \frac{1}{2} & 0 \\ 0 & \frac{1}{2} & \frac{1}{2} & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & \frac{1}{2} \end{bmatrix}$$

$P_1$

$\pi_1 = \frac{1}{2} \pi_2 + \frac{1}{2} \pi_3$  i

$\pi_2 = \frac{1}{2} \pi_3 + \frac{1}{2} \pi_4$  ii

$\pi_3 = \frac{1}{2} \pi_4 + \frac{1}{2} \pi_5$  iii

$\pi_4 = \frac{1}{2} \pi_1 + \frac{1}{2} \pi_2$  iv

$\pi_5 = \frac{1}{2} \pi_1 + \frac{1}{2} \pi_5$  v

$\pi_4 = \frac{1}{2} \pi_1 + \frac{1}{2} \pi_2$  -----iv

or  $\pi_4 = \frac{1}{2} (\frac{1}{2} \pi_2 + \frac{1}{2} \pi_3) + \frac{1}{2} \pi_3$  (putting  $\pi_1$ 's value)

or  $\pi_4 = \frac{1}{4} \pi_2 + \frac{1}{4} \pi_3 + \frac{1}{2} \pi_3$

or  $\pi_4 = \frac{\pi_2 + \pi_3 + \pi_3}{4}$

or  $\pi_4 = \frac{\pi_2 + \pi_3}{4}$  (and placing  $\pi_2$ 's value)

or  $\pi_4 = \frac{1}{4} \pi_2 + \frac{3}{4} \pi_3$

or  $\pi_4 = \frac{1}{4} (\frac{1}{2} \pi_3 + \frac{1}{2} \pi_4) + \frac{3}{4} \pi_3$

or  $\pi_4 = \frac{1}{8} \pi_3 + \frac{1}{8} \pi_4 + \frac{3}{4} \pi_3$

or  $\pi_4 - \frac{1}{8} \pi_4 = \frac{1}{8} \pi_3 + \frac{3}{4} \pi_3$

or  $\frac{8\pi_4 + \pi_4}{8} = \frac{\pi_3 + 6\pi_3}{8}$

or  $\frac{7}{8} \pi_4 = \frac{7}{8} \pi_3$

or  $\pi_4 = \pi_3$

$\pi_3 = \frac{1}{2} \pi_4 + \frac{1}{2} \pi_5$  ----- -iii

or  $\pi_3 = \frac{1}{2} \pi_3 + \frac{1}{2} \pi_5$  (putting  $\pi_4$ 's value)

or  $\pi_3 = \frac{1}{2} (\pi_3 + \pi_5)$

or  $2\pi_3 - \pi_3 = \pi_5$

or  $\pi_3 = \pi_5$

$\pi_2 = \frac{1}{2} \pi_3 + \frac{1}{2} \pi_4$  ----- -ii

or  $\pi_2 = \frac{1}{2} \pi_4 + \frac{1}{2} \pi_4$  (putting  $\pi_4$ 's value)

or  $\pi_2 = \pi_4$

$\pi_5 = \frac{1}{2} \pi_1 + \frac{1}{2} \pi_5$  ----- -v

or  $\pi_5 = \frac{1}{2} (\pi_1 + \pi_5)$  (putting  $\pi_4$ 's value)

or  $2\pi_5 = \pi_1 + \pi_5$

or  $2\pi_5 - \pi_5 = \pi_1$

or  $\pi_5 = \pi_1$

As we know  $\pi_1 + \pi_2 + \pi_3 + \pi_4 + \pi_5 = 1$

$\pi_2 = \frac{1}{2}, \pi_3 = \frac{1}{5}, \pi_4 = \frac{1}{5}$

or  $\pi_1 + \pi_1 + \pi_1 + \pi_1 + \pi_1 = 1$   $\pi_5 = \frac{1}{5}$

or  $5\pi_1 = 1$

or  $\pi_1 = \frac{1}{5}$

Putting values of all this we get

$\pi_1 + \pi_2 + \pi_3 + \pi_4 + \pi_5 = (\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}) = (\frac{1+1+1+1+1}{5}) = \frac{5}{5} = 1$

**2.1 Example:  $Mc_2$**

*The old man had been once very rich. ----- I*

*But he was now deserted by all. ----- II*

*He was lying on sick bed.* ----- **III**  
*It was in his lonely hut.* ----- **IV**  
*I could not but feel sorry for him.* ----- **V**

After assimilation or joining of five sentences into one we get —

**I could not (for) the old man, once very rich; but now, deserted by all, (as well as) lying on sick bed in his lonely hut (made me) felling sorry.**

The composition is built with in the following way

$$3. \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5$$

**2.2 Solution:**

And in a chart this composition can be presented as

Set of Sentence	V→I	I→II	II→III	III→IV	IV→V
No of State	1	2	3	4	5
Value of Each State	1	1	1	1	1

After arranging the given chart into Matrix we get a **Transitional Matrix**  $P_{i1}$  that in mentioned in below:

Transitional form of the composition

$$\begin{matrix}
 & & 1 & 1 & 1 & 1 & 1 & & \\
 \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{matrix} & \left( \begin{matrix} 1/2 & 0 & 0 & 0 & 1/2 \\ 1/2 & 1/2 & 0 & 0 & 0 \\ 0 & 1/2 & 1/2 & 0 & 0 \\ 0 & 0 & 1/2 & 1/2 & 0 \\ 0 & 0 & 0 & 1/2 & 1/2 \\ 1 & 1 & 1 & 1 & 1 \end{matrix} \right) & \begin{matrix} = 1 \\ = 1 \\ = 1 \\ = 1 \\ = 1 \end{matrix}
 \end{matrix}$$

$P_{i1}$

We shall further approach the given matrix into steps by multiplication obtaining results  $-P_{i2} = P_{i1} \times P_{i1}$

$$\left( \begin{matrix} & & 1 & 1 & 1 & 1 & 1 & & \\ & 1/4, & 0, & 0, & 1/4, & & & & \\ & 2/4 & 1/4, & 0, & 0, & & & & \\ & 1/4, & 2/4, & 1/4, & 0, & & & & \\ & 0, & 1/4, & 2/4, & 1/4, & & & & \\ & 0, & 0, & 1/4, & 2/4, & & & & \end{matrix} \right) \begin{matrix} 2/4 \\ 1/4 \\ 0 \\ 0 \\ 1/4 \end{matrix} = 1$$

$P_{i2}$

Now we get result  $P_{i1}$  Matrix from the multiplication of the initial matrix  $P_{i1}$  after approaching of the single step –

$$P_{i4} = P_{i2} \times P_{i2}$$

After approaching of next step what we get result from the matrix  $P_{i2}$  is  $P_{i4}$

$$\left( \begin{matrix} & & & & & & & & \\ & 1/16, & 1/16, & 4/16, & 6/16, & & & & \\ & 4/16, & 1/16, & 1/16, & 4/16, & & & & \\ & 6/16, & 4/16, & 1/16, & 1/16, & & & & \\ & 4/16, & 6/16, & 4/16, & 1/16, & & & & \\ & 1/16, & 4/16, & 6/16, & 4/16, & & & & \end{matrix} \right) \begin{matrix} 4/16 \\ 6/16 \\ 4/16 \\ 1/16 \\ 1/16 \end{matrix}$$

$P_{i4}$

And we, now, get  $P_5$  Matrix just after reaching of five steps

$$P_{i5} = P_{i4} \times P_{i1}$$

$$\left( \begin{matrix} & & & & & & & & \\ & 2/32, & 5/32, & 10/32, & 10/32, & & & & \\ & 5/32, & 3/32, & 5/32, & 10/32, & & & & \\ & 10/32, & 5/32, & 2/32, & 5/32, & & & & \\ & 10/32, & 10/32, & 5/32, & 2/32, & & & & \\ & 5/32, & 10/32, & 10/32, & 5/32, & & & & \end{matrix} \right) \begin{matrix} 5/32 \\ 10/32 \\ 10/32 \\ 5/32 \\ 2/32 \end{matrix}$$

$P_{i5}$

**2.3. Solution:**

Next moment we approach to explain the given composition in the light of the steady state probabilities in the Markov Chain. And from this calculation in **the steady state probabilities** what we obtain as result is that →

$$\pi_1 \pi_2 \pi_3 \pi_4 \pi_5 \left( \begin{matrix} 1/2 & 0 & 0 & 0 & 1/2 \\ 1/2 & 1/2 & 0 & 0 & 0 \end{matrix} \right)$$

$$\begin{matrix}
 0 & \frac{1}{2} & \frac{1}{2} & 0 & 0 \\
 0 & 0 & \frac{1}{2} & \frac{1}{2} & 0 \\
 0 & 0 & 0 & \frac{1}{2} & \frac{1}{2}
 \end{matrix}$$

$P_{i1}$

$$\begin{aligned}
 \pi_1 &= \frac{1}{2} \pi_1 + \frac{1}{2} \pi_2 & \text{i} \\
 \pi_2 &= \frac{1}{2} \pi_2 + \frac{1}{2} \pi_3 & \text{ii} \\
 \pi_3 &= \frac{1}{2} \pi_3 + \frac{1}{2} \pi_4 & \text{iii} \\
 \pi_4 &= \frac{1}{2} \pi_4 + \frac{1}{2} \pi_5 & \text{iv} \\
 \pi_5 &= \frac{1}{2} \pi_1 + \frac{1}{2} \pi_5 & \text{v}
 \end{aligned}$$

$$\begin{aligned}
 \pi_1 &= \frac{1}{2} \pi_1 + \frac{1}{2} \pi_2 \quad \text{----} \quad \text{---} & \text{i} \\
 \text{Or } \pi_1 &= \frac{1}{2} (\pi_1 + \pi_2) \\
 \text{Or } 2\pi_1 &= \pi_1 + \pi_2 \\
 \text{Or } 2\pi_1 - \pi_1 &= \pi_2 \\
 \text{Or } \pi_1 &= \pi_2 \\
 \pi_2 &= \frac{1}{2} \pi_2 + \frac{1}{2} \pi_3 \quad \text{-----} \quad \text{----} & \text{ii} \\
 \text{Or } \pi_2 &= \frac{1}{2} (\pi_2 + \pi_3) \\
 \text{Or } 2\pi_2 &= \pi_2 + \pi_3 \\
 \text{Or } 2\pi_2 - \pi_2 &= \pi_3 \\
 \text{Or } \pi_2 &= \pi_3 \\
 \pi_3 &= \frac{1}{2} \pi_3 + \frac{1}{2} \pi_4 \quad \text{----} \quad \text{---} & \text{iii} \\
 \text{Or } \pi_3 &= \frac{1}{2} (\pi_3 + \pi_4) \\
 \text{Or } 2\pi_3 &= \pi_3 + \pi_4 \\
 \text{Or } 2\pi_3 - \pi_3 &= \pi_4 \\
 \text{Or } \pi_3 &= \pi_4 \\
 \pi_4 &= \frac{1}{2} \pi_4 + \frac{1}{2} \pi_5 \quad \text{----} \quad \text{---} & \text{iv} \\
 \text{Or } \pi_4 &= \frac{1}{2} (\pi_4 + \pi_5) \\
 \text{Or } 2\pi_4 &= \pi_4 + \pi_5 \\
 \text{Or } 2\pi_4 - \pi_4 &= \pi_5 \\
 \text{Or } \pi_4 &= \pi_5 \\
 \pi_5 &= \frac{1}{2} \pi_1 + \frac{1}{2} \pi_5 \quad \text{----} \quad \text{---} & \text{v} \\
 \text{Or } \pi_5 &= \frac{1}{2} (\pi_1 + \pi_5) \\
 \text{Or } 2\pi_5 &= \pi_1 + \pi_5 \\
 \text{Or } 2\pi_5 - \pi_5 &= \pi_1 \\
 \text{Or } \pi_5 &= \pi_1
 \end{aligned}$$

We see  $\pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5$   
 And we know  $\pi_1 + \pi_2 + \pi_3 + \pi_4 + \pi_5 = 1$

Putting value except  $\pi_1 = 1$

We get  $\pi_1 + \pi_1 + \pi_1 + \pi_1 + \pi_1 = 1$

$$\text{Or } 5\pi_1 = 1$$

$$\text{Or } \pi_1 = \frac{1}{5}$$

That means  $\pi_2 = \frac{1}{5}, \pi_3 = \frac{1}{5}, \pi_4 = \frac{1}{5}, \pi_5 = \frac{1}{5}$

And placing all  $\pi$ 's value we get

$$\pi_1 + \pi_1 + \pi_1 + \pi_1 + \pi_1 = \left(\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}\right) = \frac{(1+1+1+1+1)}{5} = \frac{5}{5} = 1$$

**Conclusion:** Markov Chain is a stochastic process in Statistics in which the varieties of elements are shown. Being regarded as a branching process the chain denotes state and the finite set of positive integers. The states are of two forms (the first state is the recurrent state and the later, the transient state. It is important to form a larger sentence from the number of shorter sentences which is also called in Grammar as joining. To analyse Markov Chain on the given examples (2.2.1 and 2.3.1) is presented with the **Transitional Matrix** and the **Steady State Probability** showing intimate compactness between them.

**b. Statistics**

**3.1 Introduction:** Next it is described how sentences are formed from the statistical point of view. From the statistical point of view, there are two forms of sentences: one is closed sentence and the rest open sentence. Any sentence in general may be treated as both the closed sentence and open sentence. In this section I want to show how a sentence from the statistical point of view behaves like measurable components. Like components or things, it is possible to show that sentences can be measured or estimated. And at the same time we shall see how sentences with its several forms behave like measurable things. Actually it is an absolute idea by which sentence can be estimated. First of all we should clearly make out to do this that there are two sorts of Languages (**language in general** and **language of infinitum**) in which contains the elements of the particular sentence.

**3.2 Example: Rabin loves Mina**

**3.3 Description:** Let us draw a simple example to exhibit how it is possible measuring a sentence from this view. To do this I mention earlier that any sort of sentence has been forms (**closed** and **open**) with several variables.

**Rabin loves Mina.....** (General)

The following example is no doubt a simple one because it is constructed with three components (subject, verb and object). We, of course, see that the given instance has two variables - ('Rabin' and 'Mina') consisting the sentence constructions. Now let us go through the discussion. The example 'Rabin loves Mina' is a closed sentence of a particular language assumed namely Language with simple recognition.

Closed sentence - Rabin loves Mina.

Open sentence - W loves Mina.

**Open Sentences:** In the open sentences 'W loves Mina' is a sentence in which one and only one individual variable 'Rabin' of  $L^N$  is free. Now the probability of Statistics of the open sentences can be exhibited in a way:

$$\sum_{i=1}^N (W^N(W_i), P_S^N(W_i \text{ loves Mina}))$$

Where for each i from 1 to N,  $W_i$  is the ith individual constant or variable 'W' of  $L^N$ ;  $W^N(W_i)$  is the weight of  $W_i$  in  $L^N$  and  $P_S^N(W_i \text{ loves Mina})$  is the statistical probability in  $L^N$  measured as either I or O by the above reconing of the closed sentence

**W loves Mina' of  $L^N$**

**Close Sentences:** I further, point out open sentence adopted from the closed sentence =

'W loves x' is a sentence of  $L^N$  is which two and only two individual variables 'W' (Rabin) and 'x' (Mina) of  $L^N$  are free. Here two individual constants or variables of  $L^N$ , the weights are allotted normally to the pairs of individuals designated by those constants and take  $P_S^N(W \text{ loves x})$  to be the sum --

$$\sum_{i=1}^{N^2} (W^N(W_{i1}, W_{i2}), P_S^N(W_i \text{ loves } W_{i2}))$$

Where, for each i from 1 to  $N^2$ ,  $W_{i1}, W_{i2}$  are  $i^{\text{th}}$  one of the pairs just mentioned  $W^N(w_{i1}, w_{i2})$  is weight of  $w_{i1}, w_{i2}$  in  $L^N$ ; and  $P_S^N(w_{i1} \text{ loves } w_{i2})$  is the statistical probability in  $L^N$  measured as I or O again of the closed sentence.

**$W_{i1} \text{ Loves } W_{i2} \text{ of } L^N$**

The procedure can easily be applied to open sentence of  $L^N$  where three or more individual variables of  $L^N$  are free.

Again the statistical probabilities of closed sentences are also found in the following instances like —

**3.4 Example and Description:**

1. **John Doe owns a station wagon** = 1 if he does not = 0
2. **John Does is a suburbanite** = 1 if he is not = 0
3. **John Doe is a suburbanite and owns a station wagon** = 1 ; if John is a suburbanite and doesn't own a station wagon = 0 if John isn't a suburbanite = 1

According to Kemeny's hands — open sentences P of the form  $F(W) = X$

Where F = one place factor the size of /the temperature of

W = individual constant

X = individual variable

**Sentences in Sigma Notation:** Human expression takes sometimes mathematical form. There are so many instances in co-ordinating expression adopting mathematical way related to either Algebra or Statistics. It is also very clear to say that all expressions of us are possible to analyse from the proper mathematical method. To show this it is mentioned some examples, and at the same time it is to say how expressions are possible to form in this way. With the help of statistical implementation I try to show how a sentence or an expression is constructed. An expression related to this is given from D. Tagore's *Simplified Syntax* as —

**3.5 Example and Description:**

**His younger brother is a lawyer, --  $a^1$**   
**his elder brother is a doctor, --  $a^2$**   
**his sister is a teacher --  $a^3$**   
**and he himself is a magistrate. --  $a^4$**

This expression can be presented statistically as —

$$S = \sum_{i=1}^n a^i \\ = a^1 + a^2 + a^3 + a^4$$

And at the same time another instance is given to show how a sentence is formed from the pointed of sigma notation where two sigma notations are separated by a negative substance.

$$S = \sum_{i=1}^n a^i + \sum_{i=1}^n b^i$$

$$= (a^1 + a^2) + (a^3 + a^4)$$

= {(His elder brother became a doctor) and  
 (his younger brother became a lawyer)}, but  
 {(his sister worked in a laundry) and  
 (he himself worked as a sweeper.)}

To clarify about the expression it is assumed that

	‘His elder brother became a doctor’	— $a^1$
(and)	‘his younger brother became a lawyer’	— $a^2$
(but)	‘his sister worked in a laundry’	— $a^3$
(and)	‘he himself worked as a sweeper.’	— $a^4$

The congregated form of expression may be written as in the following manner:

$$S = \{(a^1 + a^2) + (a^3 + a^4)\}$$

$$S = (\sum_{i=1}^n + \sum_{i=1}^n)$$

The co-ordinating expression, of course, takes algebraic form.

Example: His elder brother became a doctor  
 and his younger brother became a lawyer,  
 but he himself remained a humble sweeper all his life.

This is again assumed as:

	His elder brother became a doctor	— $a^1$
(and)	his younger brother became a lawyer	— $a^2$
(but)	he himself remained a humble sweeper all his life.	— $a^3$

The congregated form of the given example has been presented algebraically as

$$S = \{(a^1 + a^2) + a^3\}$$

So it is clear that all co-ordinating expressions have formed either sigma or algebra in presentation.

**Conclusion:** The study of Statistics is a branch of Mathematics and is important to the description of sentence. A sentence is of two forms (Close Sentence and Open Sentence) with variables (mingling with individual or subjective variable and others) in the statistical point of view. The probability of sentences is pointed out consequently as they are treated in the grammatical form. Besides the sigma notation is used to describe compound sentence. The relevant examples (3.2.1, 3.3.1 and 3.4.1) mentioned in the above discussion are, of course, analysed with the statistical point of view

**References:**

Arora, P. N. and others. *Comprehensive Statistical Methods*. New Delhi: S Chand and Company LTD, 2007.  
 Bachman, Lyle F. *Statistical Analysis for Language Assessment*. UK: CUP, 2004.  
 Banerjee, A and others.. *Mathematical Probability*. Kolkata. UN Dhar and Sons Private LTD, 2011.  
 Chaudhury, S B and others. *Basic Principles of Statistics* (Voil. – I & II). Kolkata: West Bengal State Book Board, 2007.  
 Chung, Kai Lai. *Elementary Probability Theory with Stochastic Process*. New Delhi: Narosa Publishing House, 1998.  
 Das, N. G. *Statistical Methods* (Vol. – I&II). New Delhi: Tata McGraw Hill Education Private Limited, 2009.  
 Gun, A. M. and others. *Fundamentals of Statistics*. Kolkata: World Press, 2008.  
 Leblance, Hugues. *Statistical and Inductive Probability*. New York: Dover Publications, 2006.  
 Leech, Geoffrey and Svartvik, Jan. *A Communicative Grammar of English*. UK : Longman, 1994.  
 Lipschutz, Seymour and Lipson, Marc Lars. *Discrete Mathematics*.New Delhi: Tata McGraw Hill Education Private Limited, 2010.  
 Quirk, Randolph and Greenbaum, Sidney. *A University Grammar of English*. UK: Longman, 1995.  
 Sherry, Clifford J. *The Mathematics of Technical Analysis*. New Delhi: Vision Books, 1996.  
 Taha, Hamdy A. *Operations Research (An Introduction)*. New Delhi: Pearson Prentice Hall, 2009.  
 Thakur, Damodar. *Linguistic Simplified: Syntax*. India: Bharati Bhawan, 1998.  
 Thomson, A. J. and Martinet, A. V. *A Practical English Grammer*. New Delhi: OUP, 1994.