

A mathematical model of unemployment during covid-19 disease period

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ABSTRACT

In this paper we develop mathematical model for unemployment problem during covid-19 disease. This model is taken account of special characteristic to increases unemployment during corona virus disease period. The unemployment problem depends upon various values of parameter U, M and t. it has been observed that unemployment increases with increase the value of U. We also observed that unemployment increases rapidly with increase value of M. Again we observed that the unemployment increases with the increase of time.

KEYWORDS: Corona virus, migrate people, unemployment, lockdown, skilled variety.

I. INTRODUCTION

In recent decades the third world producing different urban form and social consequences. The big city population of third world increased faester during the period 1920-1960. Economic growth in India today hinges on mobility of labour. The contribution of the migrant workers to national income in enormous but there is little done to return for their security and well being. There is an imminent need for solutions to transform migration into a more dignified and rewarding opportunity⁴.

The urban labour market treat them with opportunistic indifference extracting hard labour but denying basic entitlements such as decent shelter, fair priced food, subsidized healthcare facilities and education. They are usually out of bounds of government and civil society^{6,7}.

Migrants from the largest part of India's vast unorganized work sector. There entry into the labour markets is marked with several endemic disadvantages³. Devoid of critical skills, information and bargaining power, migrant workers often get caught in exploitative labour arrangements that forces them to work in low-end, low-value,

hazardous work. Lack of identity and legal protection accentuates this problem.

Despite the vast number of migrant workers the policies of the Indian state have largely failed in providing any form of legal or social protection to this vulnerable group².

The heavy migration from rural areas and more traditional country towns and cities to the principle uraban centers of each country, espically to peripheral statement located in and around the national capitals⁵.

India has announced nationwide lockdown to prevent the spread of covid-19 pandemic in the country. In this lockdown period nationwide migrant problem increased rapidly.

In rural area the livelihood of self employed and wage workers are at risk. Agricultural food supply chain and markets are being disructped due to lockdown restriction movement. Families might resort to negative coping strategies such as distress sale of assets, taking out loans from informal money lenders.

Lacking jobs and money, with public transformation shut down, laksh of migrant's labour were forced to walk hundred of miles back their home villages. Lakes of them have been forced to walk for days in order to reach native places. Many workers must be having a very difficult time at this moment. Many migrant labour especially of the low skilled variety do not have the option to work from home. Many lower income people they must physically go to work, putting them at greater risk of contracting and spreading covid-19.

The covid-19 pandemic is expected to have significant impacts in terms of unemployment and under employment, especially on informal workers. In covid-19 spreads across regions with large informal economics, it is therefore expected that more informal workers will lose their jobs and face extreme poverty and food insecurity.

Corona virus has been spread by air travel all over the world.

The corona virus has increased the unemployment problem in our country. Indian economy has said that unemployment rate increases rapidly in lockdown period. The rate of unemployment was the highest in urban areas, which constitute the most number of red zones. The scene of migrant feeling urban centers including metrocity only confirmed the long held concern on their employment.

The united state has seen a huge spike in unemployment as over 26 million people have

claimed for state support because loosing of their jobs. CMIE'S weekly of data pointed to a steady increase unemployment the start of covid-19 pandemic in India.

In this infection patient with fever dry cough, headache, hypoxemia and dyspnea's^{8,9}. Death may be result of progressive from respiratory failure¹⁰.

The purpose of this paper is to develop a mathematical model for unemployment problem during corona virus all over world.

II. MATHEMATICAL FORMULATION OF THE PROBLEM

The detail some of the model outputs will be performed. This model are of relivance studies particularly in the real world. In this model unemployment of the people by corona virus is dynamic.

Let $N(t)$ be the total unemployment people at time t , the rate of change

$$\frac{dN}{dt} = N(U + M - D) \tag{1}$$

Where

$U = \text{unemployment}$

$M = \text{migrate labour unemployment}$

$D = \text{death labour}$

With boundary condition

$$N = N_0 \quad \text{at } t = 0$$

$$U = U_0 \quad \text{at } t = 0$$

$$M = M_0 \quad \text{at } t = 0$$

$$D = D_0 \quad \text{at } t = 0$$

Neglect the death case then from Eq. (1) we have

$$\frac{dN}{N} = (U + M)dt \tag{2}$$

Solution of the problem

Separate the variable in equation (2), we get

$$\frac{dN}{N} = (U + M)dt \tag{3}$$

Integrating equation (3), we get

$$\log N = (U + M)t + \log A \tag{4}$$

Applying the boundary condition in equation (4), we get

$$\log N = (U + M)t + \log N_0 \tag{5}$$

Or

$$N = N_0 e^{(U+M)t} \tag{6}$$

III. RESULT

The present paper proposes a more realistic model of explaining the unemployment problem during corona virus period. The unemployment problem depends upon various values of parameter U , M , and t . It has been observed that unemployment increases with increase the value of U . We also observed that unemployment increases rapidly with increase the value of M . Again we observed that unemployment increases with the increase of t .

From the graph of unemployment it is clear that unemployment before lockdown in united state 11.1 percent after lockdown unemployment 13.3 percent, unemployment India before lockdown 11 percent after lockdown unemployment 23.5 percent China, unemployment before lockdown 5.9 percent after lockdown unemployment 6 percent, Pakistan unemployment before lockdown 4.1 percent, after lockdown unemployment 5.5 percent, unemployment France before lockdown 7.8 percent, after lockdown unemployment 8.1 percent, unemployment Namibia 33.4 percent and after lockdown unemployment is 34 percent.

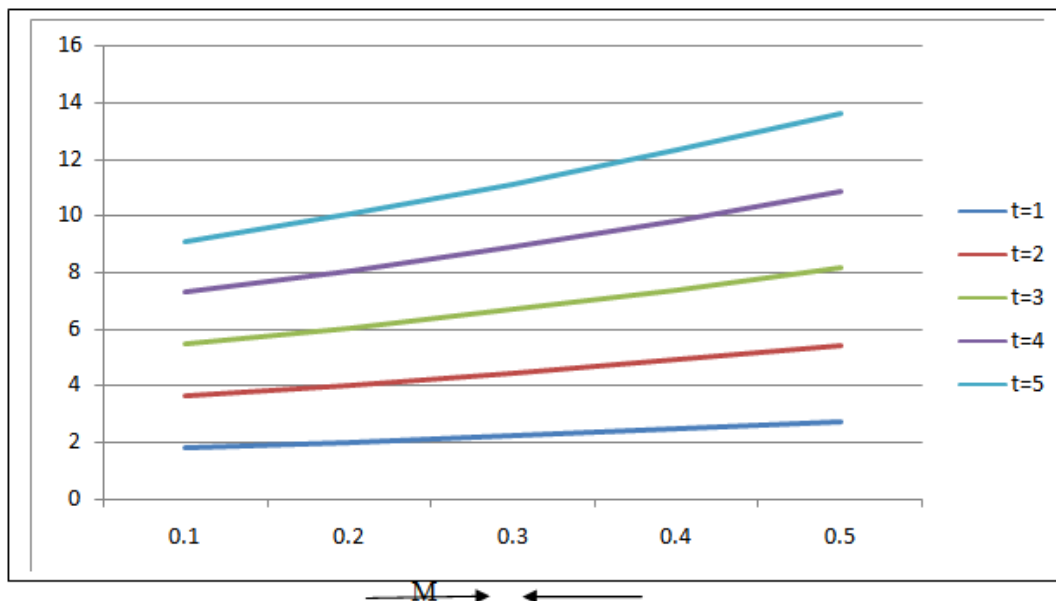
IV. DISCUSSION

From the graph it is clear that unemployment other countries increases slowly in lockdown period. But

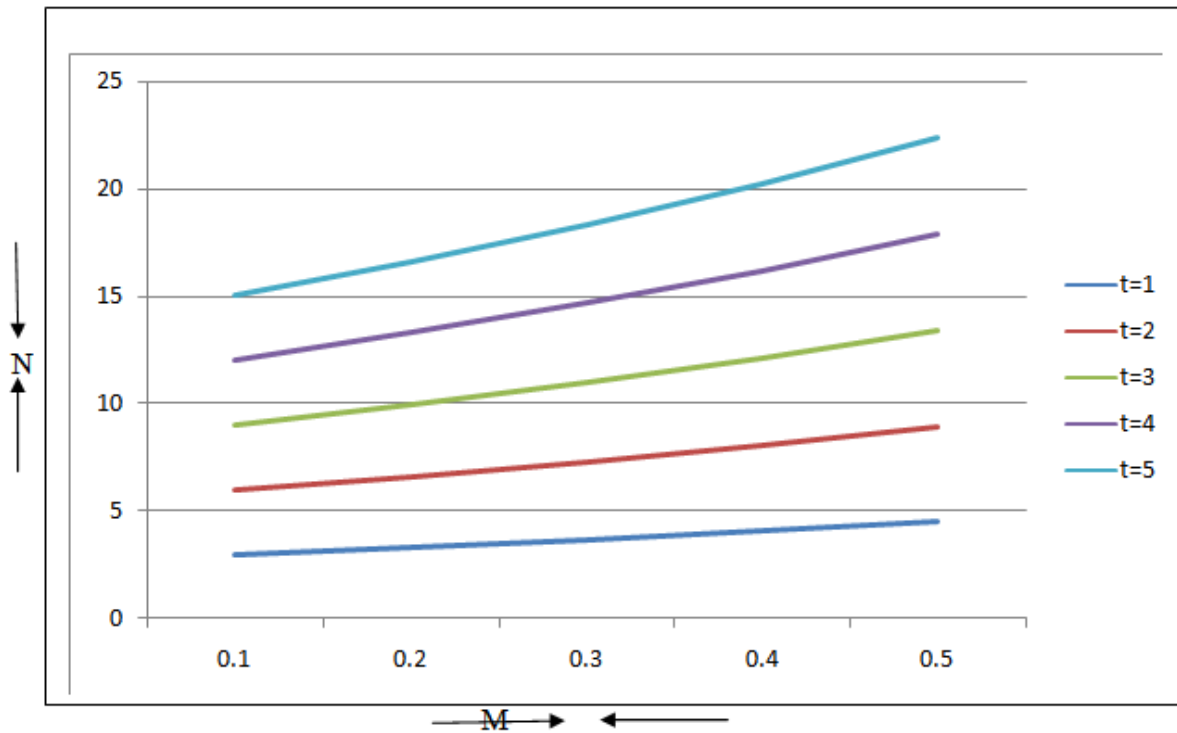
the Indian unemployment increases rapidly in lockdown period.

Variation of total unemployment at $N_0 = 1$

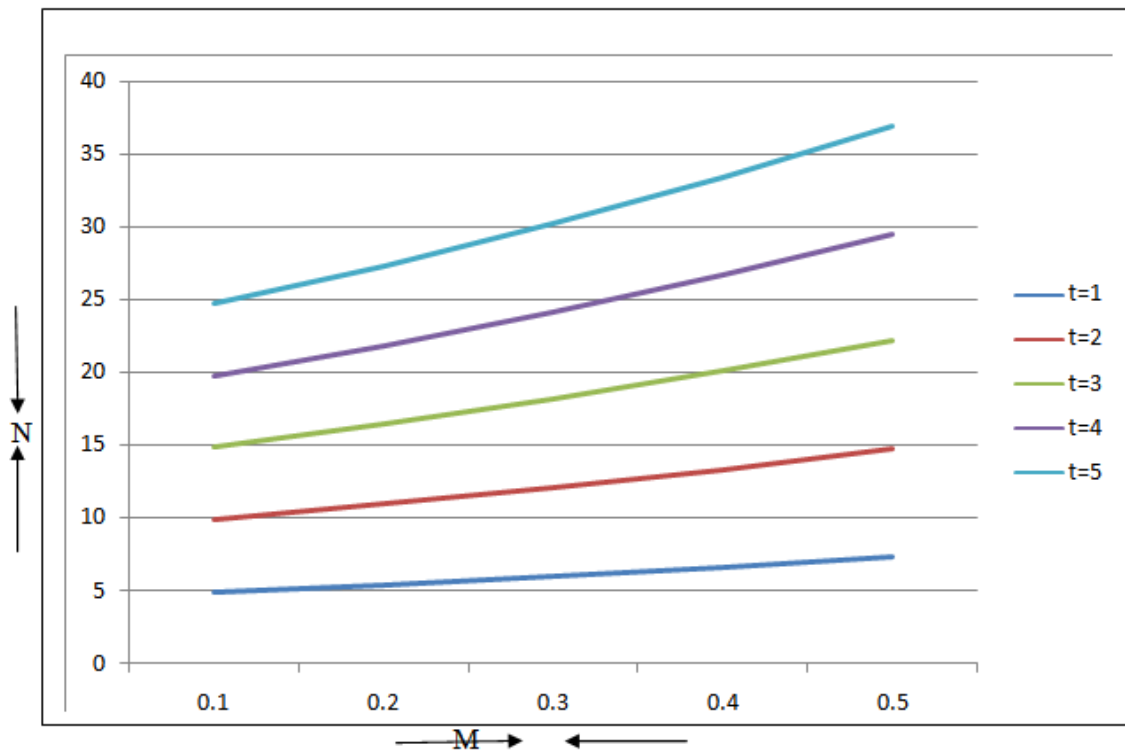
U	M \ t	1	2	3	4	5
0.5	0.10	1.8221	3.6442	5.4664	7.2885	9.1106
	0.20	2.0138	4.0275	6.0413	8.0550	10.0688
	0.30	2.2255	4.4511	6.6766	8.9021	11.1277
	0.40	2.4596	4.9192	7.3788	9.8384	12.2980
	0.50	2.7183	5.4366	8.1549	10.8731	13.5914
1.0	0.10	3.0041	6.0083	9.0125	12.0167	15.0208
	0.20	3.3201	6.6402	9.9604	13.2805	16.6006
	0.30	3.6693	7.3386	11.0079	14.6771	18.3465
	0.40	4.0551	8.1104	12.1656	16.2208	20.2760
	0.50	4.4817	8.9634	13.4451	17.9268	22.4085
1.5	0.10	4.9530	9.9060	14.8591	19.8121	24.7651
	0.20	5.4740	10.9478	16.4218	21.8958	27.3697
	0.30	6.0496	12.0992	18.1489	24.1986	30.2482
	0.40	6.6859	13.3717	20.0577	26.7436	33.4295
	0.50	7.3891	14.7781	22.1671	29.5562	36.9452
2.0	0.10	8.1662	16.3323	24.4985	32.6647	40.8308
	0.20	9.0250	18.0500	27.0750	36.1005	45.1250
	0.30	9.9742	19.9484	29.9225	39.8967	49.8709
	0.40	11.0232	22.0464	33.0695	44.0927	55.1159
	0.50	12.1825	24.3650	36.5475	48.7300	60.9124
2.5	0.10	13.4637	26.9275	40.3912	53.8550	67.3187
	0.20	14.8797	29.7595	44.6391	59.5189	74.3987
	0.30	16.4446	32.8892	49.3339	65.7786	82.2232
	0.40	18.1741	36.3483	54.5224	72.6966	90.8707
	0.50	20.0855	40.1710	60.2566	80.3421	100.4277



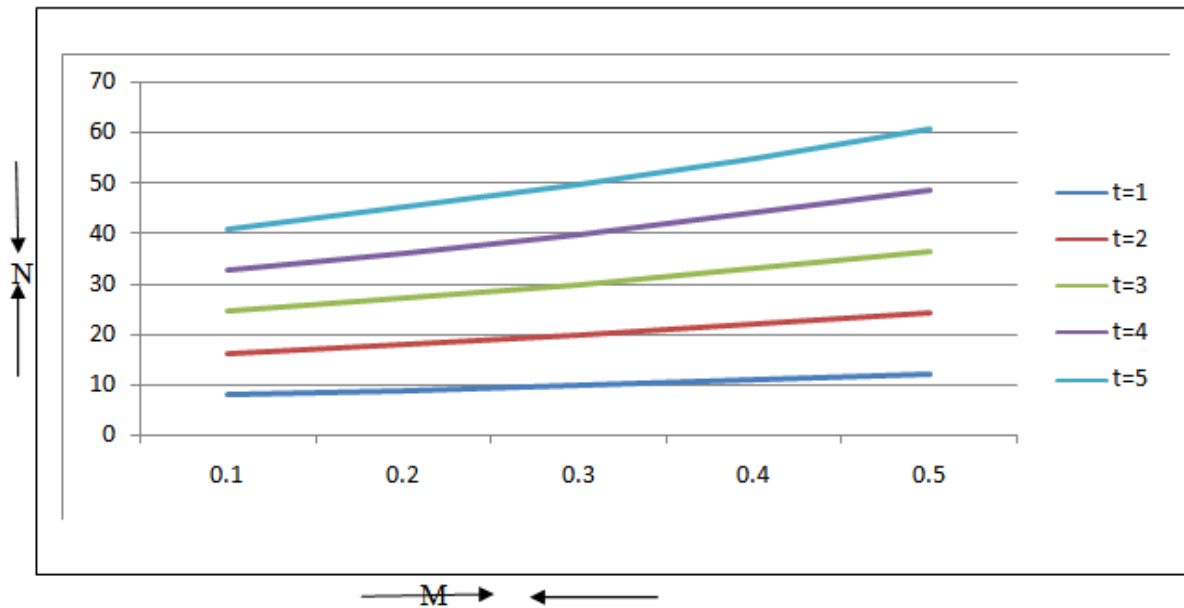
Graph (1) Variation of total unemployment for different value of M & t at $U=0.5, N_0 = 1$



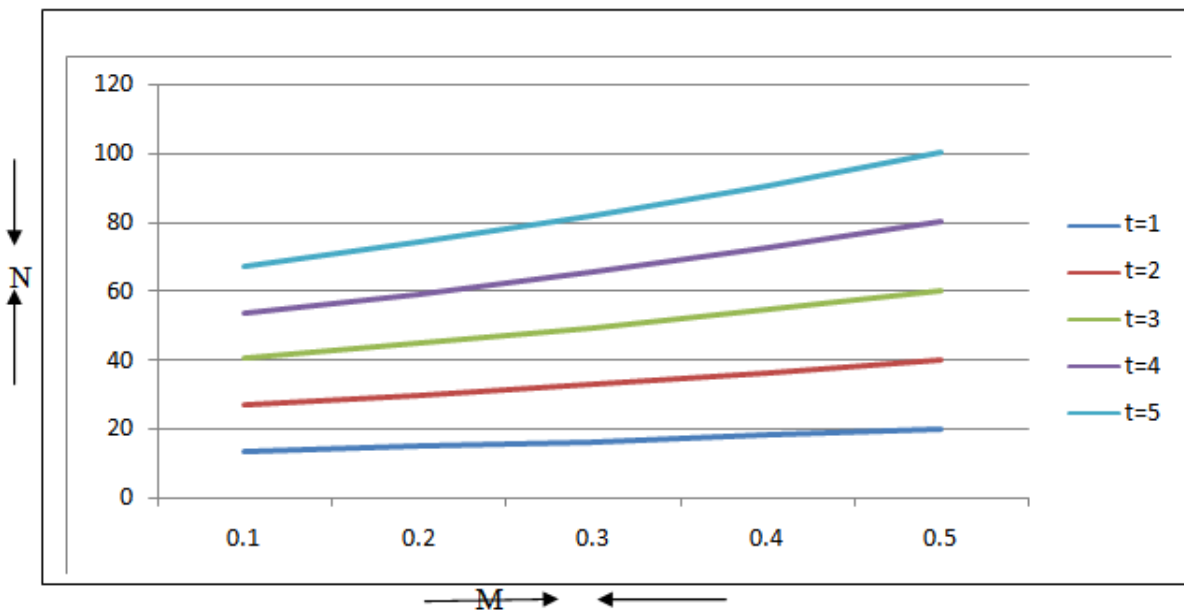
Graph (2) Variation of total unemployment for different value of M & t at $U=1.0$, $N_0 = 1$



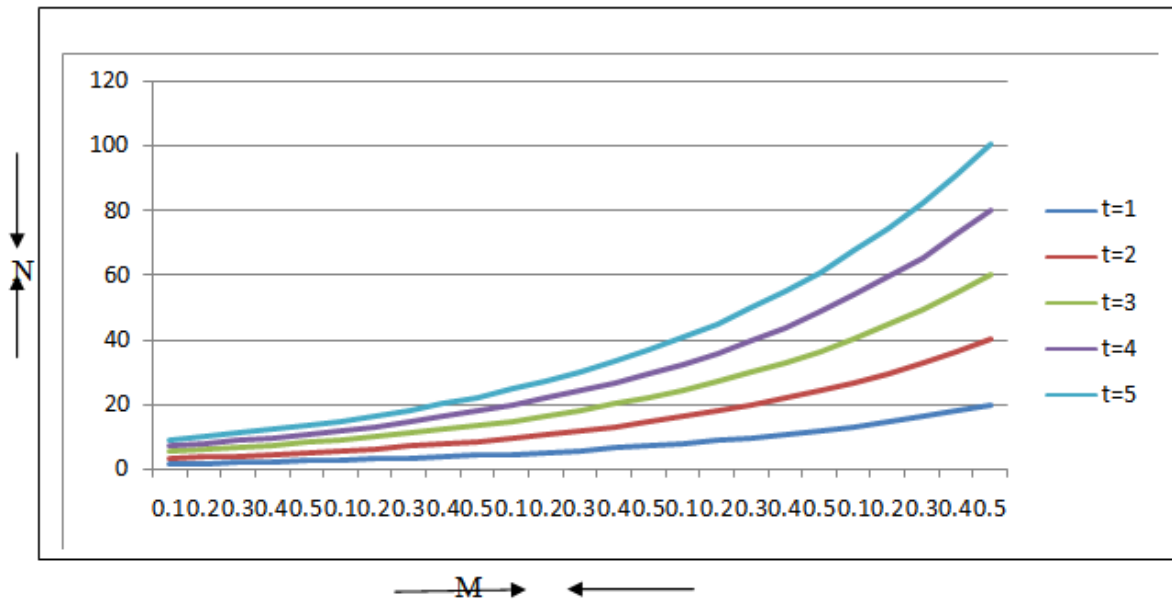
Graph (3) Variation of total unemployment for different value of M & t at $U=1.5$, $N_0 = 1$



Graph (4) Variation of total unemployment for different value of M & t at $U=2.0, N_0 = 1$

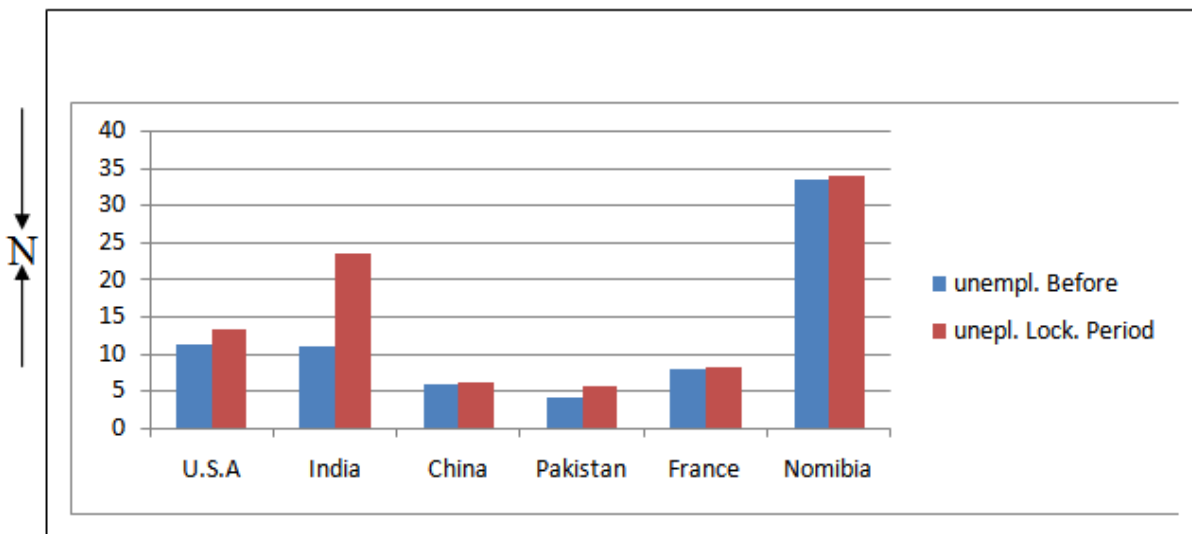


Graph (5) Variation of total unemployment for different value of M & t at $U=2.5, N_0 = 1$



Graph (6) Variation of total unemployment for different value of M & t , at $N_0 = 1$ at $U=0.5, U=1.0, U=1.5, U=2.0, U=2.5$

S.N	Country	Unemployment before lockdown in percent	Unemployment in lockdown period in percent
1.	U.S	11.1	13.3
2.	India	11	23.5
3.	China	5.9	6
4.	Pakistan	4.1	5.5
5.	France	7.8	8.1
6.	Nomibia	33.4	34



Graph (7) Variation of unemployment some countries in corona virus period

REFERENCE

- [1]. Banerijee A Raju S. (2009): Gendered mobility; women migrants and worker in urban India Econ pol. Wkely 2009, 54(28), 115-123.
- [2]. C. Annie. Jane (2016): A study of international migrant labours issues and policies. Int. Jr. of applied research Vol. 6 issue 4, p 81-83.
- [3]. Dilip Saikia (2015): Migrant workers in Kerla; A study on their socio-economic condition Jr. of economics & social development Vol.XI No. (2), dec 2015 p 29-42.
- [4]. Schwind , Paul J. (1971): Migration and regional development in united states, geography research paper No. 133, Chicago; The university of Chicago press.
- [5]. Shruthi Ashok & Neena Thomas (2014): A study on issues of interstate migrant laboures in India, International Journal of scientific & Engineering research Vol. 5, issue 7, p 91-94.
- [6]. Wolpert, Julian (1965): Behavioral aspects of the decision to migrate, paper of regional science association 15 p 159-169.
- [7]. Wolpert, Julian (1966): Migration as an adjustment to environment stress. The Jr. of social issue 22(4) p 92-102.
- [8]. Yadav A.K , Chaudhary R.. & Kumar S. (2020): Mathematical analysis of corona virus disease, International journal of trend in scientific research and development Vol.4, issue4 p 507-510.
- [9]. Yadav A.K., Kumar S. et al. (2020): A simple mathematical model for corona virus disease, International journal of creative research thoughts Vol. 8 issue 5 p 240-246.
- [10]. Yadav A.K. , Kumar S. & Yadav C.S (2020): A mathematical model for novel corona virus disease, International journal of innovation science and research technology Vol.5 , issue 4, p 1018-1021.



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