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Non Markovian Queuing System with Restricted Admissibility Method

S. Maragathasundari, R. S. Somasundaram, S. Radha

Abstract*: *This article take a glance at a cluster area single server channel Queuing system, where the server gives two sorts of vacations viz., beginning one a short vacation and the long vacation is permitted as a second vacation. Long vacation is given in two stages. First stage is compulsory and if in case of need, the server goes for a optional second stage of long vacation. In addition, the concept of restricted admissibility of customers to the system is applied during the time of optional second stage of long vacation. For the above outlined covering issue, the beneficial variable method and probability approach are utilized to determine the Probability generating capacity of the line measure and the normal length of the line. In like way the other execution degrees of the model are settled utilizing Little's law. At last, the model is guarded by procedures for numerical redirection and the model is top notch by the graphical examination.

Keywords*: *Single arrival, Compulsory long vacation, Optional service, Restricted admissibility

I. INTRODUCTION

"Reference [6] derived the steady state queue size distribution at a random point of time as well as at a departure epoch". "Reference [4] made a study on extended vacation and service interruption". "Reference [9] examined balking and re-service in a vacation queue with batch arrival and two types of heterogeneous service". "Reference [5] analyzed mobile adhoc networks problem- A queuing approach". "Reference [7] analyzed multiple server vacation". "Reference [8] investigated queue with breakdown and reneging". A study on the analysis of performance measure of bulk input queue with N type of additional optional service, service interruption and deterministic vacation examined by [11]. "Reference [3] investigated a queuing model on FIFO basis". "Reference [1] investigated the Queuing process". "Reference [13] examined some new results for departure process in the $M^X/G/1$ queuing system with a single vacation and exhaustive service". "Reference [2] has been studied restricted admissibility on Queues".

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II. MATHEMATICAL DESCRIPTION OF THE QUEUEING MODEL

The arithmetical interpretation of the Queuing framework has the capacity to be described by the resulting hypothesis:

Clients touch base at the framework in clumps of variable size in a compound procedure follows Poisson distribution. The administration time pursues general (arbitrary) circulation. First stage of giving service follows distribution function as $\overline{F_1}(x)$ and density function $\overline{f_1}(x)$. Let $\gamma_r(x)dx$ be the conditional density function. Hence we have

$$\gamma_r(x) = \frac{\overline{f_1}(x)}{1-\overline{F_1}(x)}, \quad \overline{f_1}(x) = \gamma_r(x)e^{-\int_0^s \gamma_r(s)ds} \qquad (a)$$

For short vacation,

$$\gamma_s(x) = \frac{\overline{f_2}(x)}{1-\overline{F_2}(x)}, \quad \overline{f_2}(x) = \gamma_s(x)e^{-\int_0^s \gamma_s(s)ds}$$
(b)

For compulsory long vacation,

$$\gamma_{l_1}(x) = \frac{\overline{f_3}(x)}{1-\overline{F_3}(x)}, \quad \overline{f_3}(x) = \gamma_{l_1}(x)e^{-\int_0^s \gamma_{l_1}(s)ds}$$
(c)

For optional long vacation,

$$\gamma_{l_2}(x) = \frac{\overline{f_4}(x)}{1-\overline{F_4}(x)}, \quad \overline{f_4}(x) = \gamma_{l_2}(x)e^{-\int_0^s \gamma_{l_2}(s)ds}$$
(d)

Restricted admissibility occurs with mean rate $\beta > 0$.

III. GOVERNING EQUATIONS OF THE MODEL

$$\frac{\partial}{\partial x}R_n(x) + (\lambda^r \gamma_r(x))R_n(x) = \lambda^r R_{n-1}(x) \qquad (1)$$

$$\frac{\partial}{\partial x}R_0(x) + (\lambda^r \gamma_r(x))R_0(x) = 0 \qquad (2)$$

$$\frac{\partial}{\partial x}S_n(x) + (\lambda^r + \gamma_s(x))S_n(x) = \lambda^r S_{n-1}(x) \qquad (3)$$

$$\frac{\partial}{\partial x}S_0(x) + (\lambda^r + \gamma_s(x))S_0(x) = 0 \qquad (4)$$

$$\frac{\partial}{\partial x}L_n^{(1)}(x) + (\lambda^r + \gamma_{l_1}(x))L_n^{(1)}(x) = \lambda^r L_{n-1}^{(1)}(x) \qquad (5)$$

$$\frac{\partial}{\partial x}L_0^{(1)}(x) + (\lambda^r + \gamma_{l_1}(x))L_0^{(1)}(x) = 0 \qquad (6)$$

$$\frac{\partial}{\partial x}L_n^{(2)}(x) + (\lambda^r + \gamma_{l_2}(x))L_n^{(2)}(x) = \lambda^r \beta L_{n-1}^{(2)}(x) + \lambda^r(1-\beta)L_n^{(2)}(x) \qquad (7)$$

$$\frac{\partial}{\partial x}L_0^{(2)}(x) + (\lambda^r + \gamma_{l_2}(x))L_0^{(2)}(x) = \lambda^r(1-\beta)L_0^{(2)}(x)$$
(8)

$$\lambda k = (1-c)\int_0^\infty R_0(x)\gamma_r(x)dx + (1-p)\int_0^\infty S_0(x)\gamma_s(x)dx + (1-q)\int_0^\infty L_0^{(1)}(x)\gamma_{l_1}(x)dx + \int_0^\infty L_0^{(2)}(x)\gamma_{l_2}(x)dx \quad (9)$$

IV. BOUNDARY CONDITIONS

The following boundary conditions are used to solve the above equations:

$$R_n(0) = (1-c)\int_0^\infty R_{n-1}(x)\gamma_r(x)dx + (1-p)\int_0^\infty S_{n+1}(x)\gamma_s(x)dx + (1-q)\int_0^\infty L_{n+1}^{(1)}(x)\gamma_{l_1}(x)dx + \int_0^\infty L_{n+2}^{(2)}(x)\gamma_{l_2}(x)dx + \lambda k \quad (10)$$

$$S_n(0) = c\int_0^\infty R_n(x)\gamma_r(x)dx \quad (11)$$

$$L_n^{(1)}(0) = p\int_0^\infty S_n(x)\gamma_s(x)dx \quad (12)$$

$$L_n^{(2)} = q\int_0^\infty L_n^{(1)}(x)\gamma_{l_1}(x)dx \quad (13)$$

$\sum_{n=1}^{\infty}(1)Xz^n + (2)$ gives

$$\frac{\partial}{\partial x}R_d(x,z) + (\lambda^r - \lambda^r z + \gamma_r(x))R_d(x,z) = 0 \quad (14)$$

Similarly,

$$\frac{\partial}{\partial x}S_d(x,z) + (\lambda^r - \lambda^r z + \gamma_s(x))S_d(x,z) = 0 \quad (15)$$

$$\frac{\partial}{\partial x}L_d^{(1)}(x,z) + \left(\lambda^r - \lambda^r z + \gamma_{l_1}(x)\right)L_d^{(1)}(x,z) = 0 \quad (16)$$

$$\frac{\partial}{\partial x}L_d^{(2)}(x,z) + \left(\lambda^r\beta - \lambda^r\beta z + \gamma_{l_2}(x)\right)L_d^{(2)}(x,z) = 0 \quad (17)$$

Applying the same for boundary conditions, we get

$$zR_d(0,z) = (1-c)\int_0^\infty R_d(x,z)\gamma_r(x)dx + (1-p)\int_0^\infty S_d(x,z)\gamma_s(x)dx + (1-q)\int_0^\infty L_d^{(1)}(x,z)\gamma_{l_1}(x)dx + \int_0^\infty L_d^{(2)}(x,z)\gamma_{l_2}(x)dx + \lambda zk - \lambda k \quad (18)$$

$$S_d(0,z) = c\int_0^\infty R_d(x,z)\gamma_r(x)dx \quad (19)$$

$$L_d^{(1)}(0,z) = p\int_0^\infty S_d(x,z)\gamma_s(x)dx \quad (20)$$

$$L_d^{(2)}(0,z) = q\int_0^\infty L_d^{(1)}(x,z)\gamma_{l_1}(x)dx \quad (21)$$

(14) from $0\ to\ x$ gives

$$R_d(x,z) = R_d(0,z)e^{-(\lambda^r-\lambda^r z)x - \int_0^x \gamma_r(t)dt} \quad (22)$$

Integrating (22) by parts we get

$$R_d(z) = R_d(0,z)\left(\frac{1-\bar{F}_1(h)}{h}\right) \quad (23)$$

Where $h = \lambda^r - \lambda^r z$

Multiply (22) by $\gamma_r(x)dx$ and integrating by parts, we get

$$\int_0^\infty R_d(x,z)\gamma_r(x)dx = R_d(0,z)\bar{F}_1(h) \quad (24)$$

Similarly, we have

$$S_d(z) = cR_d(0,z)\bar{F}_1(h)\left(\frac{1-\bar{F}_2(h)}{h}\right) \quad (25)$$

$$\int_0^\infty S_d(x,z)\gamma_s(x)dx = cR_d(0,z)\bar{F}_1(h)\bar{F}_2(h) \quad (26)$$

$$L_d^{(1)}(z) = pcR_d(0,z)\bar{F}_1(h)\bar{F}_2(h)\left(\frac{1-\bar{F}_3(h)}{h}\right) \quad (27)$$

$$\int_0^\infty L_d^{(1)}(x,z)\gamma_{l_1}(x)dx = pcR_d(0,z)\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) \quad (28)$$

$$L_d^{(2)}(z) = qpcR_d(0,z)\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\left(\frac{1-\bar{F}_4(e)}{h}\right) \quad (29)$$

Where $e = \lambda^r\beta + \lambda^r\beta z$

$$\int_0^\infty L_d^{(2)}(x,z)\gamma_{l_2}(x)dx = qpcR_d(0,z)\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e) \quad (30)$$

Substituting (24), (26), (28), (30) in (18), we get

$$R_d(0,z) = \frac{\lambda zk - \lambda k}{z-(1-c)\bar{F}_1(h)-(1-p)c\bar{F}_1(h)\bar{F}_2(h)-(1-q)pc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) - qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e)} \quad (31)$$

Using (31) in (23), (25), (27), (29) we get

$$R_d(z) = \frac{[\bar{F}_1(h)-1]}{z-(1-c)\bar{F}_1(h)-(1-p)c\bar{F}_1(h)\bar{F}_2(h)-(1-q)pc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) - qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e)} \quad (32)$$

$$S_d(z) = \frac{c\bar{F}_1(h)[\bar{F}_2(h)-1]}{z-(1-c)\bar{F}_1(h)-(1-p)c\bar{F}_1(h)\bar{F}_2(h)-(1-q)pc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) - qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e)} \quad (33)$$

$$L_d^{(1)}(z) = \frac{pc\bar{F}_1(h)\bar{F}_2(h)[\bar{F}_3(h)-1]}{z-(1-c)\bar{F}_1(h)-(1-p)c\bar{F}_1(h)\bar{F}_2(h)-(1-q)pc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) - qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e)} \quad (34)$$

$$L_d^{(2)}(z) = qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\frac{[\bar{F}_4(e)-1]}{\beta} \quad (35)$$

V. LIKELIHOOD CREATING CAPACITY OF THE LINE ESTIMATE

Let $M_d(z)$ be the probability generating function of the queue size, It is given by

$$M_d(z) = k\left[R_d(z) + S_d(z) + L_d^{(1)}(z) + L_d^{(2)}(z)\right]$$

Adding (32) to (35), we get,

$$M_d(z) = \frac{\bar{F}_1(h)-1+c\bar{F}_1(h)[\bar{F}_2(h)-1] + pc\bar{F}_1(h)\bar{F}_2(h)[\bar{F}_3(h)-1] + qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\frac{[\bar{F}_4(e)-1]}{\beta}}{z-(1-c)\bar{F}_1(h)-(1-p)c\bar{F}_1(h)\bar{F}_2(h) - (1-q)pc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h) - qpc\bar{F}_1(h)\bar{F}_2(h)\bar{F}_3(h)\bar{F}_4(e)} \quad (36)$$

VI. IDLE TIME AND UTILIZATION FACTOR

The normalization condition $M_d(1) + k = 1$ is used to determine k. At $z = 1\ M_d(z)$ attains 0/0 indeterminate form.

Hence using L.H rule we get, $\lim_{z\to 1} M_d(1) = \frac{N'(1)}{D'(1)}$

Hence the utilization factor ρ is found using $\rho = 1 - k$

To find L_q the length of the Queue and the Queue performance measures.

The Average queue size is obtained by the usage of L H rule in (36)

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$$L_q(z) = \lim_{z\to 1} \frac{D'(z)N''(z)-N'(z)D''(z)}{2(D'(z))^2} \quad (37)$$

$$N'(1) = \lambda^r E(F_1) + c\lambda^r E(F_2) + pc\lambda^r E(F_3) + \lambda^r qpcE(F_4)$$

$$N''(1) = (\lambda^r)^2 E(F_1{}^2) + c(\lambda^r)^2[2E(F_1)E(F_2) + E(F_2{}^2)] + pc(\lambda^r)^2[2E(F_1)E(F_3) + 2E(F_2)E(F_3) + E(F_3{}^2)] + qpc(\lambda^r)^2[2(E(F_1) + E(F_2) + E(F_3))E(F_4) + E(F_4{}^2)]$$

$$D'(1) = 1 - \lambda^r(1-c)E(F_1) - (1-p)c\lambda^r[E(F_1) + E(F_2)] - (1-q)pc\lambda^r[E(F_1) + E(F_2) + E(F_3)] - qpc\lambda^r[E(F_1) + E(F_2) + E(F_3) + \beta E(F_4)]$$

$$D''(1) = -(1-c)(\lambda^r)^2 E(F_1{}^2) - (1-P)c(\lambda^r)^2[E(F_1{}^2) + E(F_2{}^2) + 2E(F_1)E(F_2)] - (1-q)pc(\lambda^r)^2\left[E(F_1{}^2) + E(F_2{}^2) + E(F_3{}^2) + 2[E(F_1)E(F_2) + E(F_2)E(F_3) + E(F_1)E(F_3)]\right] - qpc(\lambda^r)^2\left[E(F_1{}^2) + E(F_2{}^2) + E(F_3{}^2) + \beta^2 E(F_4{}^2) + 2[E(F_1)E(F_2) + E(F_2)E(F_3) + E(F_3)\beta E(F_4) + \beta E(F_4)E(F_1) + E(F_1)E(F_3) + \beta E(F_2)E(F_4)]\right] \quad (38)$$

Substituting (38) in (37) we obtain L_q in closed form.

Further, by the usage of Little's law we get the other execution measures $W_q = \frac{L_q}{\lambda}$, $W = \frac{L}{\lambda}$, $L = L_q + \rho$

VII. NUMERICAL ILLUSTRATION

THE VALUES ARE COLLECTED ACCORDINGLY:

$\lambda^r = 3, \beta = 0.6, c = 0.5, p = 0.3, q = 0.4, \gamma_r = 3.5, \gamma_s = 5, \gamma_{l_1} = 4, \gamma_{l_2} = 4.5, E(F_1) = \frac{1}{\gamma_r}, E(F_2) = \frac{1}{\gamma_s}, E(F_3) = \frac{1}{\gamma_{l_1}}, E(F_4) = \frac{1}{\gamma_{l_2}}, E(F_1{}^2) = \frac{2}{\gamma_r{}^2}, E(F_2{}^2) = \frac{2}{\gamma_s{}^2}, E(F_3{}^2) = \frac{2}{\gamma_{l_1}{}^2}, E(F_4{}^2) = \frac{2}{\gamma_{l_2}{}^2}$

Table I
Effect of change of (p = 0.3,0.4,0.5,0.6,0.7)

Q	ρ	L_q	L	W_q	W
0.2891	0.7109	16.7738	17.4847	5.5913	5.8282
0.3322	0.6678	13.3433	14.0111	4.4478	4.6704
0.3747	0.6203	10.9610	11.5813	3.6537	3.8604
0.4168	0.5832	9.2299	9.8131	3.0766	3.2710
0.4585	0.5415	7.9177	8.4592	2.6392	2.8197

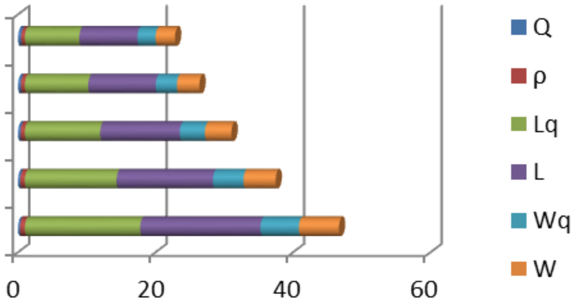

Fig. 1 Effect of change of p

From Table I It is clear that if the probability of taking long vacation increases it leads to decrease in all the performance measures. Since the long vacation gets increased the idle time gets amplified.

Table II
Effect of change of (q = 0.4,0.5,0.6,0.7,0.8)

Q	ρ	L_q	L	W_q	W
0.2891	0.7109	16.7738	17.4847	5.5913	5.8282
0.2939	0.7061	16.1775	16.8836	5.3925	5.6279
0.2986	0.7014	15.6126	16.3140	5.2042	5.4380
0.3032	0.6968	15.0766	15.7734	5.0255	5.2578
0.3079	0.6921	14.5684	15.2605	4.8561	5.0868

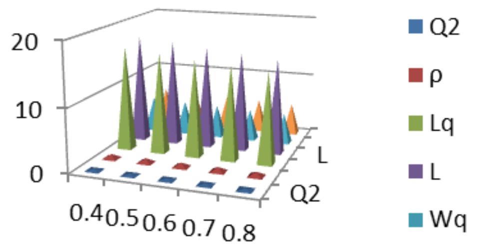

Fig. 2 Effect of change of q

Table 2 indicates that, as the probability of taking optional second stage of long vacation gets increased, its corresponding execution measures gets decreased. In addition, idle time increase whereas the utilization factor gets diminished.

VIII. CONCLUSION

The above model gives an intensive report about the lining issue including a few parameters like Single landing, single administration, short excursion, phases of Compulsory long get-away, restricted acceptability during the season of long get-away. The model is very much examined and its practically equivalent to lining execution measures are resolved. Numerical investigation and pictographic portrayal gives an unmistakable image of the model characterized.

REFERENCES

1. Abdolrahim Badamchi Zadeh, "A Batch Arrival Queue System with Coxian-2 Server Vacations and Admissibility Restricted", *American Journal of Industrial and Business Management*, Vol 2, pp.47-54, 2012.
2. G. Ayyappan and K. Sathiya , "M^X/G/1 Feedback Queue with Three Stage Heterogeneous Service and Server Vacations having Restricted Admissibility", *Journal of Computations and Modeling*, Vol. 3, No. 2, pp. 203-225, 2013.
3. G. Ayyappan and S. Shyamala , "Time Dependent Solution of M^X/G/1 Queuing Model with second optional service, Bernoulli k- optional vacation and balking", *International Journal of Scientific and Research Publications*, Vol. 3, No. 9, pp.1-13, 2013.
4. B. Balamurugan and S. Maragathasundari, "A study on the performance analysis of a batch arrival queue with two stages of service Bernoulli schedule vacation extended vacation and service interruption", *International journal of computer applications*,Vol.124, No.12, pp.33-37, 2015.
5. Dhanalakshmi and S. Maragathasundari ,"Mobile adhoc networks problem- A queuing approach", *International journal of communication networks and distributed systems*, vol..21, No.4, 2018.
6. Kailash C. Madan and Gautam Choudhury , " An M^X/G/1 Queue with a Bernoulli vacation schedule under restricted admissibility policy", *The Indian Journal of Statistics*, Vol. 66, No. 1. pp. 175-193, 2004.
7. S. Maragathasundari and S. Srinivasan, "Analysis of M/G/1 feedback queue with three stage and multiple server vacation", *Applied mathematical sciences*, Vol..6, No.125, pp.6221-6240, 2012.
8. S. Maragathasundari and S. Srinivasan , "A Non-Markovian Multistage Batch arrival queue with breakdown and reneging", *Mathematical problems in engineering*, Volume 2014/16 pages/ Article ID 519579/ http: // dx. Doi. Org / 10.1155/2014/ 519579. 2015.
9. Monita Baruah, Kailash C. Madan and Tillal Eldabi , " Balking and Re-service in a vacation Queue with Batch Arrival and Two Types of Heterogeneous Service", *Journal of Mathematics Resesarch*, Vol. 4, No. 4, pp. 115-124, 2012.
10. Shan Gao and Yunfei Yao , "An M^X/G/1 queue with randomized working vacations and at most J vacations", *International Journal of Computer Mathematics*, Vol. 91, No. 3, pp. 368-383, 2014.
11. S. Sowmiah and S. Maragathasundari , "A study on the analysis of performance measure of bulk input queue with N type of additional optional service, service interruption and deterministic vacation", *Imperial Journal of Interdisciplinary Research*, Vol.2, No.8, pp.1436-1444, 2016.
12. Vishwa Nath Maurya , "Mathematical modeling and performance analysis of single server two-state batch arrivals and batch service markovian queue with multiple vacations", *American Journal of Modeling and Optimization*, Vol. 2, No. 2, pp. 39-46, 2014.
13. Wojciech M. Kempa , "Some New Results for Departure Process in the M^X/G/1 Queuing system with a Single Vacation and Exhaustive Service", *Stochastic Analysis and Applications*, Vol 28, No. 1, pp.26-43, 2009.

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