Algorithm For Frequency Division Multiple And Time Division Multiple Access Schemes

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Abstract- This paper represents a number of stochastic decomposition properties for the general holiday model with respect to queue size and incomplete work, then consider an entire service system with multiple holidays, analysis of vacation cycle, queue size, incomplete work, waiting time In FCFS, LCFS and ROS systems and time dependent processes. The rule to eliminate the holiday period, dependent on each holiday model, should approximate the process of future arrivals.

Index Terms- Stochastic decomposition, probability, distributions, waiting time, time interval, elapse time.

1. INTRODUCTION

Systems with server discharge are called a continuous period of non-zero length during which the server is not working during the holiday period. The duration of a holiday period is an integral multiple of the slot period. The system has at least one message (Adar, Z., N. Ahituv, and O. Berman, 1985) at the end of the holiday period. First consider an entire service system, in which the holiday period begins only when there is no message in the management at the end of the service. If nth represent the numeral of messages that arrive during the service time of the message, the numeral of messages that arrive during a holiday period that is the PGF for the number of messages that came before the random slot during the holiday period. In a system with holidays the queue size at the time of service completion is equal to the same distribution as in a system without holidays and the number of messages that arrive before an arbitrary slot during a holiday period that the two quantities are independent. Similar decomposition properties hold for the distribution of queue sizes, joint distributions of queue sizes and elapsed service times and incomplete work distributions in the system, whole being observed instantly after an random slot limit. A different form of decomposition can be derived for the waiting time of a message for systems in which the waiting time is not affected by future arrival processes. These decomposition properties are generally called stochastic decomposition. Who first established a continuous-time system for both queue size and waiting time, incomplete work.

2. MULTIPLE VACATION MODELS

In multiple vacation models with exhaust service, the server starts vacation when there are no messages in the management at the (Berman and M.R. Rahman, 1985) last of the service. If the server returns from holiday to empty the management, it immediately begin working and continues to work until the system is emptied repeated. If the server get back from a holiday to discover messages holding in a queue, it immediately starts other holiday, and in this way repeats the holiday until it returns at least one waiting message when it returns from the holiday. Finds the length V of each holiday is considered (Green, L., 2001) an integral multiplier of the slot duration, an independent and evenly distributed random variable. The PGF for V is defined by V (u), so

$$v(l) = Prob[V = l], \quad l = 1,2 \qquad (1)$$

$$v(u) = \sum_{l=1}^{\infty} v(l)u^l \quad |u| \leq 1 \qquad (2)$$

The special case in which V (u) = u in many holiday models is equivalent to the system without holidays. Consider a service cycle that includes a service period followed by a holiday period. Stochastic decomposition, using properties, give PGFs for queue size quickly after completion of a service for queuing sizes immediately after arbitrary slot limits, and an arbitrary slot limit for incomplete work in the system. Give combined PGFs for queue size, clasp service time, queue size and endure service time, both being perceived quickly after (Green, L., and Kolesar, 1984) an arbitrary slot limit during a busy period, also given a PGF limit for the reduction time after an arbitrary slot has gone. Looking at a packet model separately as an application for performance evaluation of data communication protocols, the waiting time and response time are compared for FDMA (Frequency Division Multiple Access) and TDMA (Time Division Multiple Access) schemes.

3. VACATION CYCLE

Consider a holiday period whose length is byI_v. Many holiday models have multiple holidays in a single holiday period during which no message (Hall and R.W., 2009) arrives and a holiday during which at least one message arrives. The combined PGF of the length of the holiday, the probability that have no message arrives during that holiday.

$$\sum_{l=1}^{\infty} v(l)[\lambda(0)]^l u^l = V[\lambda(0), u] \qquad (3)$$

Consequently, the combined PGF of the length of a holiday, at least one message during that holiday is likely to arrive.

$$\sum_{l=1}^{\infty} v(l)\{-[\lambda(0)]^l\}u^l$$

$$= V(u) - V[\lambda(0), u] \qquad (4)$$

Hence

$$(u) = \sum_{l=0}^{\infty} \{V[\lambda(0)]\}^l \{V(u) - V[\lambda(0), u]\}$$

$$= \frac{V(u) - V[\lambda(0), u]}{1 - V[\lambda(0), u]} \qquad (5)$$

The mean length of a vacation period is

$$E[I_v] = \frac{E[V]}{1 - V[\lambda(0)]} \qquad (6)$$

Let the length of busy period. Since PGF is given by$V[\emptyset(z)]$, for the number of messages arriving during the holiday, PGF α (z) for the number (Jarvis, J.P., 1991) of messages α that occur during the holiday period.

$$\alpha(z) = \frac{V[\varphi(z)] - V[\lambda(0)]}{1 - V[\lambda(0)]} \qquad (7)$$

Which yields,

$$E[\alpha] = \frac{\lambda E[I]}{1 - V[\lambda(0)]} = E[I_v] \qquad (8)$$

Since the length of the holidays is independent, the successive pairs of a holiday period (Jordan and W.C, 1986) and the busy period are the regeneration cycle of the system state. Such a regeneration cycle is called a discharge cycle, the length of which is represented by C_v. Let C_v (u) be the PGF for C_v. Since the holiday cycle is same to a delay cycle, which is the starting delay given by the holiday time, at least one message arrives.

$$C_v(u) = \frac{V\{uV[\varphi(z)] - V[\lambda(0)u]}{1 - V[\lambda(0)]} \qquad (9)$$

That produces

$$E[C_v] = \frac{E[V]}{(1-\rho)\{1 - V[\lambda(0)]\}}$$

$$= E[I_v] + E[\theta_v] \qquad (10)$$

The fraction of time that the management is busy

$$\frac{E[\theta_v]}{E[C_v]} = \rho \qquad (11)$$

The fraction of time that the management is in a holiday period

$$\frac{E[I_v]}{E[C_v]} = 1 - \rho \qquad (12)$$

There are messages in the system during a part of the holiday period. System is empty then

$$P(0) = \frac{(1-\rho)\{1 - V[\lambda(0)]\}}{E[V]\{1 - \lambda(0)\}} \qquad (13)$$

Service cycle: A service period, whose length is (Larson and R.C., 1999) represented by S_v is defined as a time interval that starts at the end of one holiday and ends at the beginning of the next holiday. If no message exists in the system at the end of the holiday, the length of the following service period is zero, then

$$S_v(u) = V\{V[\varphi(z)]\} \qquad (14)$$

A service cycle, whose length is denoted by C, includes a service period and leave. In other words, a service cycle is a time interval that is initiated at the (Halpern and J, 1999) end of one holiday and ends at the end of the next holiday. A service cycle is also a regeneration cycle of the system phase. Since the length of a leave independent of the duration of the preceding service period, the PGF for C is C (u)

$$C(u) = S_v(u)\, V(u) \qquad (15)$$

Service cycle C differs by a time interval denoted by (Hill and D.M., 1998) the length C'which is initiated at the beginning of one holiday and ends at the beginning of the next holiday. PGF for by C' is $C'(u)$

$$C'(u) = V\{uV[\varphi)z)]\} \qquad (16)$$

$$E[C'] = \frac{E[V]}{1-\rho} \qquad (17)$$

3.1 Queue size and unfinished work

Using decomposition properties search PGF for queue size and incomplete work. Substituting (7) into (8) then

$$\beta(z) = \alpha(z) = \frac{1 - V[\varphi(z)]}{E[V][1 - \varphi(z)]} \qquad (18)$$

As the PGF for the numeral of messages present in the management (Goldman and P.R.,1999) at the starting of an random slot during the holiday period, it is also the PGF for the number of messages that arrive before the arbitrary slot during the holiday.

$$E[\beta] = \frac{\lambda E[V(V-1)]}{2E[V]} \ldots \ldots \ldots \ldots \ldots 19)$$

3.2 Waiting time in FCFS system

Find the PGF W (u) for the waiting time of an arbitrary message in a FCF system, considering a system equivalent (Green and L., 1998) to a super granule if a group of messages arrives in a super table in the same slot, including a $Geo^x/G/1$ system also includes $Geo^x/G/1$ super images such that the virtual wait time in original Geox / G / 1 system is equal to the waiting time of the super mug in Geox / G / 1 system. In original Geox / G / 1 system the waiting time for an uncontrolled message includes the waiting period for the Super Mage and (Geoffrion and A.M., 1999) the waiting time for an arbitrary message within Super Magic. PGF and mean for the number of incoming super messages in a slot. The system of supermages with FCFS in $Geo^x/G/1$ equals the number of super messages present at the end of service in the discipline as one super message, equal to the number of super messages that occurred during the time of that super message. In the system. PGF for service times of those messages within the same super message that are served before an arbitrary message.

3.3 Waiting time in LCFS system

The PGF for the waiting time of an randomly message in an LCFS system, is again the add of waiting time (Chruch and R.L, 2010) of a super message, the waiting time within the super message, first consider PGF for the waiting time of a super message in corresponding Geo/G/1 system of super messages. A super message arrives during a vacation period with probability$1-\rho$. The waiting time (OP Singh, 2019) of this super message same the delay cycle whose beginning delay is the remaining holiday time at arrival point. Since the PGF for the remaining vacation time seen by an arriving super message. The waiting time of an arbitrary message is the total of the waiting time of the super message to which it belongs and the waiting time with in the super message.

Queue size, the elapsed service/vacation time

The combined distribution of queue size, elapsed holiday time or elapsed service time (depending on the state of the server) immediately after an arbitrary slot limit, introduces a random variable ζ (n) that represents the server's status immediately nth slot.

$$\zeta^{(n)} = \begin{cases} 0 \ , & on\ vacation \\ 1 & busy \end{cases} \quad n = 0,1,2,3, \ (20)$$

Where $\zeta(0)$is assumed to be the state of the server at the beginning of the first slot. Let line size quickly following the nth slot. The elapsed holiday time quickly following the nth slot if the server is on holiday at that time. The elapsed administration time of a message being served following the nth slot if the server is occupied around then. The PGF for the index of slot boundary at which a new vacation is started for the first time. Once the system becomes empty, subsequent slot boundaries at which the (OP Singh, 2019) system is empty and a vacation is therefore started are renewal points of the system state, because vacations times are independent. Since the interregnal times is equivalent to the delay cycle initiated with a vacation. Let us consider an initial busy period process started with an empty system at the beginning of a vacation and terminated when the system becomes empty after the vacation.

Queue size, the remaining service/vacation time

Combined distribution of server status, line size and remaining excursion time or remaining service time immediately after slot limits. Server status following nth slot. Resize the queue following nth slot. Leave excursion time following nth slot if the server is on holiday (OP Singh, 2020) at that time and occupied at that time, the rest of the service time of a message is following nth slot. Messages during holiday; the process ends soon after discharge. The combined distribution of server state, line size, and rest of the holiday time or remaining service time immediately after slot limit. Server status following the nth slot. Resize the queue following nth slot. Leave the holiday time following the NT slot if the server is on holiday and occupied at that time, the rest of service time of the message is given following nth slot. Messages during holiday, the process ends soon after discharge.

Packet model

A polling system of M stations with complete service in which the service time of each message is always a slot. Consider the special case of their (OP Singh, 2020) system in which M = 1 is a packet model of a $Geo^X/D/1$ system with multiple holidays. Q (z) Denote PGF for the numeral of packets present in the management L^* .When returned to the server at discharge time, which explicitly returns

$$Q(z) = V[\wedge(z)] \qquad (21)$$

A service period as a time interval between two successive holidays. If there are no packets in management at the last of the holiday, the following service period has a zero length. Let $\phi(w)$ be the PGF of the number of packets served during a service period. ϕ is equal to the duration of a service period measured in slots, as a packet model assumes. Therefore

$$\phi(w) = Q[\Gamma w] \qquad (22)$$

Where Γw is the PGF for the number of packets served during a occupied period initiated with a packet. The equation for being Γw is given by

$$E(\phi) = \frac{\lambda E(V)}{1-\lambda} \qquad (23)$$

When considering the queue size, the slot limits at which each holiday expires and hence the service periods are initiated are the regeneration points of the system state. A time interval between such uplift points is a service cycle. The index of a slot at the end of which the mth service (OP Singh, 2020) cycle is started, where m = 1,2… from the property of a regenerative process, the PGF P (z) of the line size following an randomly slot boundary. The number of packets present in system immediately after nth slot during the service cycle.

4. CONCLUSION

Hence, if the mean response time is a sole performance measure, the TDMA is superior to the FDMA. The difference in the mean response time grows linearly with the number of users, irrespective of traffic intensity. However, this difference is negligible at high traffic intensity when the term inversely proportional to $1 - \lambda$. As an application of the multiple vacation model, comparing the waiting time and the response time between two protocols for the access of a communication channel by multiple users: FDMA and TDMA. Therefore, if the mean response time is the only performance measurement, then TDMA is better than FDMA. The difference in average response time increases linearly with the number of users, regardless of the traffic intensity. However, this difference is negligible at high traffic intensity when the term is inversely proportional to 1-λ. As an application of the Multiple Vacation Model, a comparison of the waiting time and response time between two protocols for access to a communication channel by multiple users FDMA and TDMA.

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