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de WA2LQO

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Communications Systems (continued from June 2010)

By Bob Wexelbaum, W2ILP\

A high pass RC circuit (which consists of a capacitor in series with the signal and a resistor in parallel with the signal) has a transfer function; $H(f) = 1 / \sqrt{1 - j f \text{ sub } 1 / f}$ where $f \text{ sub } 1 = 1 / 2 \pi RC$

The frequency $f \text{ sub } 1$ is the 3-dB frequency of the RC network and is generally described as the low frequency cutoff of this network. I won't attempt to apply calculus to what is defined as the correlation of waveforms. The correlation of waveforms is a measure of the similarity or relatedness of waveforms. This is more precisely defined as the *average cross correlation* between two signal voltages. If there is a phase shift between two similar waveforms, there will be a finite correlation which can be described mathematically. The term *coherence* may be used as a synonym for correlation. Functions may be described as being *uncorrelated* or *correlated*. In this way periodic shifted waveforms or waveforms of finite energy may be mathematically defined. This leads to more calculus than I had originally intended, so I want to now change the subject to the study of "Random Variables and Processes". That was another college course, but it was reviewed in the Communications Systems course. The first thing that the Random Variables instructor told the class was that random variables that we will learn about are neither totally random nor variable without limits, because if they were, they could never be manipulated by anyone in their right mind, in the first place, no matter what course he or she might take. Why do we study random variables? We study them because we need to learn about a subject called Information Theory. We need to know about this stuff to understand how much information we can pack into a signal and how good are the odds that the signal can be recognized when there is lots of noise and/or unwanted signals coming in along with it. If that doesn't interest you, you might be motivated by the fact that gambling odds at Las Vegas, as well as any crap game, can be determined by the application of these theories. A signal voltage can be determined for all times as an explicit or *deterministic* function when there is no *uncertainty*. In order to carry any information a *signal* must be unpredictable. If this newsletter was entirely repetitive it would be predictable, thus it couldn't carry any new information. When hams are trying to work meteor scatter and get signals that carry enough information through to get a QSL, they may be concerned with densely packing information, but normally ham communicators are not so much interested in sending the maximum amount of information in the minimum amount of time to the extent that modern communication system developers might be. However, hams, particularly hams who work HF, are concerned with getting their signals heard through the noise or overcoming other signals in pile-ups. A signal that is not completely predictable can have some *probability* of being predictable. For example if the signal is in the form of a code, such as Morse Code, it can be assumed that the code has a limited number of characters (letters, numerals and punctuations) that need to be decoded, and any noise or signal that doesn't fit the definition of a character can be ignored. Suppose that one of the possible outcomes of an experiment is called "A" and that when we repeat the experiment "N" times the outcome occurs "N sub a" times. The relative frequency of occurrence of "A" is "N sub a / N". This ratio can not be predictable unless "N" is very large. For example, if we toss a die, let us assume that "N" is the number 3 on the die, in six tosses the number 3 may not appear at all or it may appear 6 times, or any number of times in between. Thus with $N = 6$, $(N \text{ sub } a) / N = 1$. However we know from experience that when an experiment, whose outcomes are determined by chance, is repeated *very many times*, the relative frequency of an outcome approaches a fixed limit. Thus if we were to toss the die many times the

relative outcome would be expected to be very close to 1/6. This value is called the probability of outcome "A", and is written as "P (A)" so that: $P(A) = \text{limit } (N \text{ sub } a) / N$, for N approaching infinity as a limit. In many cases the experiment is described more by concepts and words than by math and symbols. Suppose that we have 10 balls in a container, and 8 are white balls and 2 are black balls. Let us ask about the probability that a single ball, blindly selected, will be a black ball. We can believe that the probability of drawing a black ball is 2/10, assuming that the ball is drawn blindly and there is no reason to believe that there is any physical preference involved. This leads to another definition of probability, and that is:-

$P(A)$ = number of favorable outcomes divided by the total number of possibly equally possible outcomes
In either definition the probability of occurrence of an event P is a positive number that lies between 0 and 1. $P = 0$ would mean that an event is impossible, while $P = 1$ would mean that it is certain. Two possible outcomes of an experiment are defined as being *mutually exclusive* if the occurrence of one precludes the occurrence of the other. In this case, if the events A sub 1 and A sub 2 with probabilities $P(A \text{ sub } 1)$ and $P(A \text{ sub } 2)$, then the probability of either A sub 1 or A sub 2 is given by: $P(A \text{ sub } 1 \text{ or } A \text{ sub } 2) = P(A \text{ sub } 1) + P(A \text{ sub } 2)$. Thus for a large number of N there will be an outcome where A sub 1 has occurred N sub 1 times and A sub 2 has occurred N sub 2 times so that:-

$P(A \text{ sub } 1 \text{ or } A \text{ sub } 2) = (N \text{ sub } 1 + N \text{ sub } 2) / N = N \text{ sub } 1 / N + N \text{ sub } 2 / N = P(A \text{ sub } 1) + P(A \text{ sub } 2)$. If it should happen that there are only "L" possible events, then the sum of L events approaching 1 is $P(A_j \text{ sub } j) = 1$
Next month I will probably continue with the joint probabilities of related and independent events. I dunno how many of you good readers will follow, but the subject of probability is probably the easiest to be encountered here.

(To be continued next month).

<p style="text-align: center;">PRESIDENT'S NOTE by ED GELLENDER, WB2EAV JULY 2010</p>

Well, we now have another Field Day under our belts. They just keep coming around every June and we meet them head-on. This year was our third time at the Dix Hills Park and Golf Course. Things worked out well logistically and a good time was had by all. We are currently in a drought, but the bright side is that it got us out of the usual Field Day rain shower.

We entered with three stations, but some transmission line problems and mutual interference issues kept us from soaring with the eagles. Of course, the fact that the HF bands were not at their best didn't help one bit either. In the end we had 192 CW contacts and 335 SSB contacts. See elsewhere in this issue for particulars.

As always Jack, WA2PYK made sure that everyone was well fed.

As for me, I had my own perfect storm of an improbable string of family obligations, and had to leave before we finished setting up. I then actually had to attend three separate commitments which I could not get out of, including one in the NNJ Section, returning just in time to finish packing up. Since we keep much of the equipment on Northrop Grumman property, I made up for my poor attendance by wrangling with company security until they unlocked the place for us on a Sunday afternoon.

I have always thought that the Field Day contest is a magnificent idea. If the ARRL put out the word that they had planned an Emergency Readiness exercise over an entire summer weekend, they might get a few hardy, dedicated souls to come out while everyone else was at the beach. But, in a devilishly clever ruse, they disguised it as a contest, which brought people out people in droves; people who listened to the arcane rules and then got down to the serious business of fighting tooth-and-nail for the top score. In doing so, almost despite themselves, they learned what to do if the usual infrastructure lets them down.

Vy 73, Ed WA2EAV

**GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 6/16/2010
By Karen. W2ABK, Secretary**

The meeting was called to order by Gordon at 5:25 PM

TREASURER'S REPORT – Ed. EWB2EAV

Finances continue to be in good shape.

REPEATER REPORT - Gordon, KB2UB

The repeaters are working fine.

VE REPORT – Bob, W2ILP

Nine amateur applicants; one upgraded to Extra, one upgraded to General, four passed Technician, three failed Technician. No Commercial applicants. VEs were AB2ZW, W2ABK, and W2ILP.

NET REPORT – Zack, WB2PUE

Thursday night net on 145.33 had a few check-ins. Sunday morning net will be missing its net control operator, Gene, W4JMX, who is going on vacation for 6 weeks.

OLD BUSINESS

Field Day preparation: It was reported that Field Day was ready to go. The Huntington Town truck was scheduled and we were to meet with Bill N2SFT's truck to pick up the generator. A meeting was scheduled at the Dix Hills Park on June 25th at 2 PM to set up the antennas.

NEW BUSINESS

We were pleased to see members, Bert Wengler and Ed Wright (both paid membership dues) in person at this meeting.

PROGRAM

Gordon, KB2UB brought in a DVD on boating rescue and emergency operation at sea, which showed the latest in emergency equipment.

The meeting was adjourned at 6:20 PM

GARC NETS:

40 Meters: 7.289 MHz at 7:30 AM EST Sundays.

Net Controller: Eugene, W4JMX

2 Meters (via repeaters): 146.745 MHz (-.600 kHz) at 8:15 PM EST Thursdays.

145.330 MHz (-600 kHz) at 8:30 PM EST Thursdays

Net Controller: Zack, WB2PUE [Tone for both repeaters is 136.5 Hz]

(ARES/RACES on Mondays)

MEETINGS

General Meetings of the GARC are held on the third Wednesday of each month, starting at 5:30 PM. The meetings are usually held at the Ellsworth Allen Park in Farmingdale. Driving directions and maps can be obtained from <http://www.mapquest.com> It is suggested that the GARC Web Site be checked to be certain of meeting location, which may change after this newsletter is distributed. Board meetings are held a week before the General Meeting at the Bethpage skating rink.

GARC WEB SITE

The web site of the GARC can be found at <http://www.qsl.net/wa2lqo/> Webmaster is Pat Masterson, KE2LJ. Pictures of GARC activities, archives of newsletters, roster of members, and other information about the GARC may be found there.

INTERNET LINK OF THE MONTH FOR INTERNERDS

The URL for this month is “Steven Hawking: How to Build a Time Machine” which was an article in the “Daily Mail” of the UK. It has a long address so I suggest that you get to it by Googling up “Steven Hawking - time machine”. Hawking has a vivid imagination, which goes far beyond Gore’s theory of Global Warming, which Hawking has confirmed. From his article, you can learn about theoretical “worm holes”, which are even more timely than run of the mill black holes. I can’t say that I completely understand Hawking’s reasoning. Time will tell if there is any truth to his theory. If we could find a worm hole we might not even have to wait to prove its existence, because we could then navigate to a time when it could be proved by its own intrinsic identity. This would be a lot more scientific than H.G. Wells’ machine was cracked up to be. Einstein’s special relativity theory mathematically comes to the conclusion that space is curved. If so, time might be warped, but I dunno if it can be warped into what Hawking calls a “worm hole”. It seems like wishful thinking that may warp our minds into hoping that we can go back to the future or go forward to the past. I don’t want to go back to the past to correct the errors that I made in my youth. I’d rather go forward to the future to enjoy making mistakes about stuff I can’t understand at a time when there are many more complex modern technologies to blame my ignorance on.

PUZZLE

Here is another Cryptogram:

UN UW AUMMUGYQN NK BXN H DHT NK YTAXZWNHTA WKDXNJUTB LJXT
JUW WHQHZR AXFXTAW YFKT JUW TKN YTAXZWNHTAUTB UN.
--YFNKT WUTGQHUZ--

Solution to the June 2010 Cryptogram:

**WE HAVE THE BILL OF RIGHTS. WHAT WE NEED IS A BILL OF RESPONSIBILITIES.
--BILL MAHER--**

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CONTRIBUTING WRITERS

All the members of GARC (we hope!)

CQ de WA2LQO is published monthly by the Grumman Amateur Radio Club for its members and friends. Send articles and amateur equipment advertisements to: W2ILP. Articles may be sent by e-mail or postal mail. They can be in MS Word format or simply in plain text. Articles will only be edited when permission is granted by the author.

ELECTRONIC SUBMISSIONS

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Pat-Masterson@tampabay.rr.com
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Edward.Gellender@ngc.com or
wb2eav@yahoo.com

EDITORIAL

Last month we held a busy VE session with nine applicants, and only the minimum required number of VEs. So far nobody has registered for our scheduled July VE session; so it might be cancelled. I think that we are not getting applicants because most folks don't want to take tests in the summer. They would rather go to the beach. There are now no applicants for the new Technician exams which were changed as of July 1st, 2010. I have downloaded and printed the new exams. I suppose that the prospective hams are still studying the new material. I will keep the VEs informed if we are going to cancel, as I don't want any to show up if there will be no session.

I won't comment much about our recent FD, because it is covered elsewhere by our President and our Trustee, except to say that when I arrived I saw Gene Reilly, K2IFB operating. He wasn't mentioned. During the night we were visited by Roger Kai, K2QT and Dick Knadle, K2RIW. Dick gave me a riddle to solve and I goofed up on it. It was about the contributed weight of birds in a closed box on a nearly overweight truck. Did the truck weigh less when the birds were forced to fly? What do you guys think? According to Dick, I gave the wrong answer.

73, w2ilp (I Like Physics) were it not for the birds.

GARC VE EXAMS

We are continuing to proctor exams for all classes of ham licenses on the second Tuesday of each month, starting at 5:00 PM.

The present exams are:-

Element 2: Technician

Element 3: General

Element 4: Amateur Extra Class

The fee for 2010 is \$14.00 for all exams taken in one sitting. The ARRL-VEC now charges \$15 but W5YI-VEC has decided not to change the required fee.

Applicants for upgrades should bring their present license and a photocopy of it and know their FRN number.

New, first time applicants should be aware that their Social Security number will be required on their application form, unless they register with the FCC for an FRN.

All applicants should bring picture ID such as driver's licenses.

Until further notice exams will be given at:-

Briarcliffe College

1055 Stewart Avenue

Room: Long Beach #5

Bethpage, NY

Briarcliffe, Bethpage is located in a building that was formerly part of the Grumman complex.

All applicants should contact W2ILP to register, so as to confirm location. If no applicants apply, the exam session will be cancelled.

For any related information e-mail w2ilp@optonline.net or phone:-

(631) 499-2214

Study material is available at the web sites of the

ARRL-VEC:- <http://www.arrl.org> or

W5YI-VEC:- <http://www.w5yi.org>

All VECs use the same Q & A pools.

The Technician exam Q & A pool has been changed and is now in use as of July 1, 2010.

Since the beginning of the VE program the GARC has provided opportunities to take the ham exams monthly, during all 12 months of every year.

CE EXAMS

We are certified by the National Radio Examiners to administer exams for all classes of FCC Commercial Radio Operator Licenses. All CEs use the same Q&A pools.

To register for commercial exams contact W2ILP.

GRUMMAN AMATEUR RADIO CLUB OFFICERS FOR 2010

President	Ed Gellender	WB2EAV	X02-14	516-575-0013
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1Yr Board Member	Dave Ledo	AB2EF		
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2 Yr Board Member	Jack Cottrell	WA2PYK	Retiree	516-249-0979
Trustee WA2LQO	Ray Schubnel	W2DKM	Retiree	

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FIRST CLASS

DO NOT DELAY

FIELD DAY
June 26-27, 2010
“Quick Look”

By Ray Schubnel, W2DKM

Field Day is over. Thanks to all who showed up to help out! On Friday afternoon our setup went smoothly with the help of the cherry picker truck all of our ropes were up in the trees in less than half an hour! The Saturday setup crew included our president Ed, WB2EAV Bill, N2SFT and XYL Carol, Gordon, KB2UB, Karen, W2ABK, Ed Wright, KB2RPZ, Jack, WA2PYK, and yours truly, W2DKM.

We had the antennas up, power cords routed, stations rigged and the generator running by 1 PM. Then the fun started, as we had way too many problems with cranky tuners, bad coax, inter-station interference and lousy band conditions. But, isn't that what Field Day is all about? If everything went

smoothly, we would miss the opportunity to resolve those problems. Hopefully, we all learned from these experiences, so if we ever get called to operate under emergency conditions, we are better equipped to handle what Murphy throws at us!

Our operating crew included many of the setup crew plus John, KA2YIY and Bob, W2ILP (who both operated over the wee hours Saturday night into Sunday morning). Our score of 1438 for this year reflected the poor band conditions. (20 closed early Saturday, and 40b was very noisy most of the FD period.) We made 192 CW contacts (mostly on 40) and 335 SSB contacts (over 100 each on 40 and 75).