FEEDBACK

MAY 2018

Field Day Site Set

Last year, when Johnson County Parks and Recreation closed the observation tower site in Shawnee Mission Park, it offered the club Field Day space at the nearby "Hutton Farm". The farm was easy to find, offered plenty of separation for operating groups and enough shade to keep operators comfortable, all of which made it popular with club members and visitors.

We're going back.

Look for the the site on 87th street, just west of the "3&2" baseball facility and the Ridgeview entrance to the Shawnee Mission Park. You will see hams and antennas from 87th street.

See you June 23 and 24.

Gregory Wolfe, president of the Santa Fe Trail Amateur Radio Club offers a "Basic Appraoch to Troubleshooting" at the April 13 JCRAC meeting. (Photo by Charlie Van Way, NØCVW.)

MAY MEETINGS

May 11 *-- Shell Game Fox Hunt -- Bring an HT or other foxhunting equipment. We'll use the field north of the Church.*

May 26 *– Raspberry PI and Amateur radio -- a demo of APRS and FLDIGI/FLMSG using a Raspberry PI -- Bill Gery, KA2FNK*

The Johnson County Radio Amateurs Club normally meets on the 2nd and 4th Fridays of each month at 7:30 PM at the Overland Park Christian Church (north entrance), 7600 West 75th Street (75th and Conser), west of the Fire Station.

Much of the membership travels to the Pizza Shoppe at 8915 Santa Fe Drive for pizza buffet and an informal continuation/criticism/clarification   of the topics raised at the meeting ... or anything else.

LEAVE THE CHURCH, TURN RIGHT (WEST) ON 75TH. TURN LEFT (SOUTH) ON ANTIOCH. TURN RIGHT (WEST) ON SANTA FE. PIZZA SHOPPE IS JUST PAST THE SONIC ON YOUR LEFT.

IN THIS ISSUE

It was a Dark and Stormy Night

It may only have been active imaginations, but when what might have been a far-away storm siren sounded for what might have been a whole second, dog and daughter bolted for the basement. If the world was coming to an end, they intended to be underneath looking up.

Of late, the Buckner family practice in such situations is to head to the basement and fire up the 2-meter rig to tune into KØECS on the 145.47 repeater. "ECS" is--per jocogov.org--the offical [sic.] storm spotting organization for Johnson County Emergency Management".

Johnson County gets whatever it gets out of the program. From a purely selfish standpoint, our family gets two very real benefits from tuning in. The obvious benefit is that we hear reports from people who are outside in the storm. We know that our neighborhood is not being destroyed because someone else is outside looking around and telling us that we've not all been blown away. Finally, we get the report that all of the "activity" has moved on into Missouri, which is our "all clear".

Beyond the substantive weather reporting, we get bits of human interest stories that take our minds off of our own situations and give us other thihngs to discuss. *Did Alpha One say SEVEN inches of rain at his location?* Charlie Four has moved to the covered parking lot. *I wonder where that is?* Alpha Six has visitors. *Who would be out visiting in a storm?* And, after some definition and explanation of the terminology, *Do you think they're all right?*

Before long "the activity has moved into Missouri" and we've weathered another storm.

Thanks, to all the guys and gals in ECS.

-- Chip Buckner, ACØYF

PRESIDENT'S CORNER

Thanks to all that helped Jay Greenough, WJØX, with the Field Day 2018 program last month. I believe we are poised for another fun field day in 2018.

We still need a person to help with lining up the food for Saturday night. If you can help with this please let Jay and me know.

Ted Knapp, NØTEK, has sent out an invitation for volunteering at Ensor. We only need to cover a few hours we should be able to spread the time among the members. Remember that each time you volunteer, your name goes into the hat for a gift certificate to use at Associated Radio.

We normally have two Fox hunts during the summer. For new hunters and old, the program for May 11 will be a practice hunt. Bring your HT or other Fox Hunting equipment. We will be setting up a transmitter in one of several coffee cans. Your task will be to pick out which can the "Fox" is in. Weather permitting we will use the Field to the north of the church.

– Bill Gery – WA2FNK

Johnson County Radio Amateurs Club - April 13, 2018

Meeting Date: Friday April 13, 2018. The meeting Started at 7:00PM.

Attendance: Self introduction with name and call sign. 31 signed the check in sheet. This was followed by the Pledge of Allegiance.

The Minutes from the March 23, 2018 meeting were read and accepted unanimously.

There was no Treasurer's report.

Old Business:
- We welcomed all 1st time visitors to the meeting.
- Repeater Update – All are working well.
- A new Fusion Repeater was recently added in Louisburg. This Repeater is not currently linked in to the other Fusion Repeaters in the Kansas City area. Plans are to eventually do so.
- Field Day 2018 – June 23 – 24. We have our planning session for Field Day at the next meeting – April 27th.
- Lon Martin, KØWJ announced the next VHF Handheld Shootout. It will be on Friday June the 8th. It was scheduled for May 11th however Lon will be out of town.

New Business:
- Ensor Museum volunteers needed for the month of May. The link to the online Sign-up is on the Homepage of the Club's website.

Reports:
- 6 m – NR
- 10 m SSB Roundtable – 0 participated on April 11 and 6 participated on April 4.
- 40m SSB Roundtable – 6 participated on April 12.
- Fusion Digital 440 net – 14 Check-ins on April 11 and 22 for Check-ins on April 4.
- 2m Wheat Shocker net – 12 Check-ins on April 12 and 20 for Check-ins on April 5.
- HF Activity – Morocco and Northern Ireland on 40m CW.

Announcements:
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:28 PM

Program:
- The Program for this evening was a Presentation on "Basic Troubleshooting Methodology" by Greg Wolfe, KIØKK, President of the Santa Fe Trail Amateur Radio Club.

Johnson County Radio Amateurs Club - April 27, 2018

Meeting Date: Friday April 27, 2018. The meeting Started at 7:00PM.

Attendance: Self introduction with name and call sign. 31 signed the check in sheet. This was followed by the Pledge of Allegiance.

The Minutes from the April 13, 2018 meeting were not available to read.

The Treasurer's report, as follows, was read and accepted unanimously.

Cash on Hand	$ 118.00	Repeater Operating Reserve	$ 1,000.83
Checking Account	$ 742.52	Memorial Fund	$ 310.00
Savings Account	$ 9,925.20	Active Members	153
PayPal Account	$ 317.83		
Total	$ 11,103.55		

Old Business:
- We welcomed all 1st time visitors to the meeting.
- Repeater Update – All are working well, but the 9-1 machine was off the air for 3-4 hours. The problem was traced to some tower cleaners' machinery blowing a fuse inn the blockhouse. The fuse was replaced and all is well.
- Joel Meddings, K0JEM announced that he was putting together General Class license course, but location was still not determined.

New Business:
- Ensor Museum volunteers needed for the month of May. The link to the online Sign-up is on the Homepage of the Club's website.
- Cal Lewandowski, KC0CL announced that the club had run out of club shirts. It was moved and seconded that the club allocate up to $700 to restock its shirt supply. The motion passed unanimously.
- John Raydo, K0IZ suggested that the meetings be shortened to allow more time for programs by placing the minutes on the club website instead of reading them. After some discussion, the club President asked John to write an amendment to the by-laws allowing that. John agreed to write it and present it at a future meeting.
- Tom Wheeler, N0GSG suggested that the club issue 'challenge coins' for members to exchange or give to members of other clubs. The ensuing discussion revealed that challenge coins are well known to veterans as part of a ritual that could result in free drinks at a bar or, having to buy drinks for everyone in the bar. No decision was made.

Reports:
- 6 m – NR
- 10 m SSB Roundtable – NR.
- 40m SSB Roundtable – 4 participated on April 25.
- Fusion Digital 440 net – 15 Check-ins on April 25 and 19 for Check-ins on April 18.
- 2m Wheat Shocker net – 21 Check-ins on April 26 and 17 for Check-ins on April 19.
- HF Activity – Morocco and Northern Ireland on 40m CW.

Announcements:
- Sonny Fontes KD0SHI, a young member of the club, was congratulated for passing his Extra Class exam.
- Herb Fiddick, NZ0F announced that WW1USA is in two weeks and will be an outside station. Santa Fe Trail Club is hosting it and there will be various transmitters including CW.
- Bill Gery, KA2FNK announced that the May fox hunt will consist of 4 coffee cans, on with the transmitter under it spaced out behind the church. The contestants must determine which can has the transmitter from a considerable distance away.
- Larry Staples, W0AIB offered a DMR HT radio for raffle and Partick KE0IDD won it.
- See Larry's List for upcoming Events.

Business meeting adjourned at 7:28 PM

Program:
- The Program for this evening was a discussion about this years Field Day activities and stations.

Notes taken by Jaimie Charlton, AD0AB.
Submitted by Ted Knapp, N0TEK, Secretary.

Hambone vs. the Current Law

"Professor Erlenmeyer Flask, a name that will live in infamy in AC Electronics 101!" announced Hambone to no one in particular in the frat house living room. "I still say the guy tricked me into giving a wrong answer. He's had it in for me ever since I called him 'Early Bird' in the cafeteria. What was he doin' in the student section anyway?"

"I don't think he's so bad," commented one of the guys stretching his long body out covering the entire couch. "I had him last year and he gave me a 'B' and I wasn't the brightest light in his class."

"He probably liked you, he gave me a 'D' on the last quiz," countered Hambone. "He said I jumped to an answer, the wrong answer, without considering all the information given.

Then he did a demonstration of the problem to prove he was right. Show off! I still think his demo was rigged."

"Okay, Hambone, stop whining and tell us about this mysterious problem that Professor Flask used to beat you into the ground," came a disembodied voice from behind an enormous overstuffed chair.

"It's pretty simple, that's why I think he's playing a trick." Said Hambone sketching his problem on the back of a handy coaster.

"Here's the first step. He took this thing he called a load – later we found out it's a plain old panel relay – and measured its resistance with an ohmmeter. It showed 75 ohms.

He then hooked it up to 120 VAC in series with an AC ammeter. The ammeter showed 178 ma."
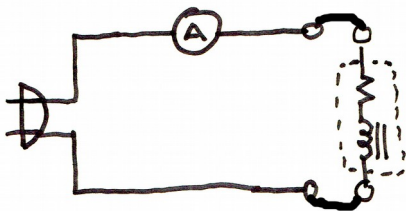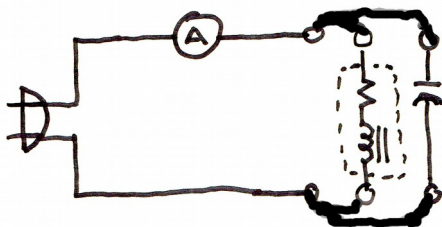

"That's too little. Shouldn't that have been about one and a half amps?" commented one of the boys.

"Yeah, that's what I thought, but it was 178 milliamps.
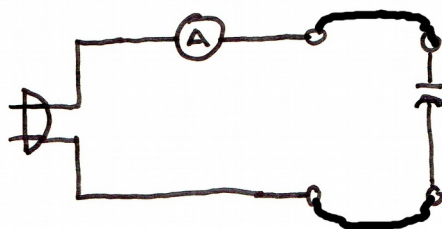
Anyway, for step two," said Hambone, grabbing another coaster. "He disconnected the load and replaced it with a plain old 3 microfarad capacitor, like this. He said that the ammeter should read about 135 milliamps, and it did."

"That looks… okay to me," yawned the voice from behind the chair.

"Finally," said Hambone trying to talk over the pop-top snapping of his frat brothers opening their afternoon beers. "He connected both the load and the capacitor like so and asked what current the ammeter shows.

I said that because the capacitor and the load are in parallel their currents add so the ammeter should show 313 milliamps. Don't you guys agree?"

"Oh yeah, yeah, you're right," replied the frat brothers more or less in unison. "In parallel circuits, currents add up. That's the current law, everyone knows that."

"Well, the professor said the correct answer is around 52 milliamps. And he demonstrated it," sighed Hambone. "His ammeter showed 55 milliamps, close enough."

"It's simple, the professor made a mistake, he's pretty old you know. And so is his ammeter," agreed one of the frat brothers as he popped open another summer cooler.

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DANGER! DANGER TO NUMERICALLY CHALLENGED READERS!

MATH AHEAD!

"Well, let's run the numbers and see what we get," said Uncle Elmer. "You are right in thinking that circuit is just a simple parallel combination of an inductor with some series resistance, and a capacitor."

"That's what I thought, Unck, so I just added up the currents to get the total current."

"That's what I thought, Unck, so I just added up the currents to get the total current."

"Hammy, your approach would work if you were only dealing with resistors. But here we have both a capacitor and inductor so you just know things aren't going to be so simple. In your solution, you didn't consider that the phase of the current in a capacitor leads the applied voltage by 90 degrees and …"

"…the phase of the current in an inductor lags the applied voltage by 90 degrees," interrupted Hammy. "I know, Unck, we learned that last semester."

"It seems that you learned how to say it, but not how to use it. Anyway, let's solve the problem and see what we get."

Hambone's heart fell when he saw Elmer reach for a yellow pad and marker pen. He'd hoped that his uncle would simply agree with him. But he now knew that Instead of getting agreement, he was getting a lecture.

"Our approach will be to find the actual *impedances* of the relay and the capacitor, combine them using the parallel-loads formula and then find the current through that combination, began Elmer."

"I'm not sure I follow you, Unck, but okay."

Adopting his full professorial posture and tone of voice, Elmer began scribbling and talking.

"Let's start by finding the *magnitude, |Z|*, of the relay's impedance. We can use Ohm's Law for that. You know that applying 120 VAC causes 0.184 amps to flow through it.

Remember, we use the letter 'Z' for impedance so we can tell it's different from plain old resistance and the double-bar | | symbol means magnitude. So, Ohm's law is:

$R = E/I$ Where R means ohms, E means volts and I means amps.

Substituting our new letter and numbers into that formula:

$|Z| = E/I = 120v/0.184 = 652\Omega$."

"That's more or less what I'm saying, Unck. It's just Ohm's law."

"But, Hammy, you stopped too soon. You need to know the entire impedance, not just the magnitude. That is, you need both the real and the reactive, or imaginary, parts.

You know that the resistive part, or R, is 75Ω because that was measured with an ohmmeter. You also know that the magnitude of both the 75Ω and the reactive part combined is 652Ω because you just found it.

What you seem to have forgotten is that the magnitude, |Z|, you found is actually the square root of the sum of the squares of the real and reactive parts like so," said Elmer rapidly writing formulas as he talked."

"Unck, what's the X? Is that some kind of unknown thing?"

"Hammy, did you forget everything from last year? X is the symbol for reactance. We use X so we can tell it from resistance even though both are measured on ohms.

$|Z| = \sqrt{R^2 + X^2}$

Since we know both Z and R, we can use that formula to find X, like this:

$Z^2 = R^2 + X^2$

or

$X^2 = Z^2 - R^2$

Which means:

$X = \sqrt{Z^2 - R^2}$

Putting in numbers we get:

$X = \sqrt{884^2 - 75^2} = 648\Omega$

Now that we know both the resistive part, 75 ohms, and the reactive part, 648 ohms, of the relay's impedance, we can write the whole thing:

Zrelay = (75+j648) ohms.

Notice that we use the lower case letter 'j' to indicate that the 648 ohms is reactive. Incidentally, j always equals the square root of – 1."

"This is getting awfully complicated, Unck," sighed Hambone.

"Not really, Hammy. It's just what you have to do when dealing with caps and coils and AC. Now let's find the impedance of the capacitor.

Since it is pure capacitance, its impedance has no real, or resistive part. It's all reactive.

Capacitive reactance is found using the formula:

$$Xcap = \frac{1}{2\pi fC} \text{ ohms}$$

Where

f = 60 Hz

C = 3 microfarads

pi = 3,14

Xcap = 884 ohms

Since the real part of the capacitor's impedance is 0 ohms - because we are assuming this is a really good capacitor - we can write it's total impedance as:

Zcap = (0 – j884) ohms

"That looks like the same form as for the inductor except the 'j' is negative, why?"

"It's a mathematical convention having to do with the fact that the current through an inductor lags the applied voltage by 90 degrees and the current through a capacitor leads the applied voltage by 90 degrees. Inductive reactance is always regarded as positive and capacitive reactance is always negative.

This is where I think you went wrong. Even though reactances and resistances are both measured in ohms, they are nowhere near the same. You can't just add currents through reactances like you can with resistors."

"My grade sure proves that," moaned Hambone. But I don't see why you can't."

Becoming even more professorial, Elmer continued, "It is because the currents lead and lag their voltages. In plain resistors, it doesn't matter if we're talking AC or DC, current and voltage are always in-phase and we don't even think about it. But with AC and capacitors and inductors, we must consider those pesky phases."

"Okay, Unck, how do we do we consider those 'pesky' phases?"

"That's easy," continued Elmer. "You just combine those impedances – using their whole form, not just their magnitudes--

using the same formulas you use for combining resistors. It's just the math becomes a bit hairier.

In you case, the impedances of the capacitor and the relay are in parallel, so we use the formula for combining resistances in parallel.

$$R_{total} = \frac{R_1 R_2}{R_1 + R_2}$$

But we change the Rs to Zs, like this:"

$$Z_{total} = \frac{Z_{Relay} Z_{Cap}}{Z_{Relay} + Z_{Cap}}$$

"That's easy," said Hambone, perking up a bit.

"Now we put in our numbers," said Elmer:

$$Z_{Total} = \frac{(75 + j648)(0 - j884)}{(75 + j648) + (0 - j884)}$$

"Oh, oh, that's not so easy," said Hambone.

"It's just arithmetic," countered Elmer. "You begin by multiplying out the numerator terms and adding the denominator terms to get just one complex number on the top and one on the bottom.

$$Z_{Total} = \frac{572830 - j66300}{75 - j236}$$

See, the numbers get big, but it's not very hard. Just remember that j times j equals –1 and –j times +j equals +1."

"Okay, Unck, maybe that was easy. But now, how do you divide that complex number on top by the one on the bottom. That's not so easy."

"It's easy, too. Be still and learn." continued Elmer, a hint of a smile crossing his face. "You simply multiply both the numerator and denominator by the *conjugate* of the denominator."

"By the WHAT?"

"The conjugate, it's a fancy word for the denominator with the sign of the j term changed. Like this.

$$Z_{Total} = \frac{572830 - j66300}{75 - j236} \cdot \frac{75 + j236}{75 + j236}$$

"See, I'm multiplying both the numerator and the denominator by the conjugate of the denominator. This is where the magic happens."

"You've lost me, Unck. But, I'm gonna need magic to pass this class." said Hambone.

"Here it is. It turns out that when you multiply a complex number by its conjugate, the j disappears and you're left with a regular number. Of course, we have to multiply the numerator by the same thing to keep from changing the overall value.

Multiplying everything out we get:

$$Z_{Total} = \frac{42,962,000 + j135,190,000 - j4,972,500 + 15,647,000}{61,321}$$

See, no j in the denominator. Now it's just simple division."

"Whoa, Unck! That's way too complicated. Isn't there an easier way to do this?"

"Sure, Hammy. You could use an engineering calculator like the one over there or even a website with an app that will do the numbers for you. But, as an engineer, you should know how to do this simple algebra. You never know when you may find yourself having to solve a problem with only a four-function calculator or maybe just a pencil and paper."

"Oh man! I think I'll switch to law school. It's gotta be easier than this." *[I'll vouch for that, Hambone! -- Ed.]*

Ignoring Hambone's whining, Elmer finished his number crunching.

$$Z_{Total} = \frac{58,609,000 + j130,220,000}{61321} = 956 + j2113 \text{ ohms}$$

"See, there you have the whole impedance of that relay and the capacitor connected in parallel and the magnitude is:

$$|Z_{Total}| = \sqrt{956^2 + 2113^2} = 2319 \text{ Ohms}$$

Now, Hammy, let's see what the total current actually is," Said Elmer, building to a big finish:

"Going back to good ole' Ohm's Law:"

I = E/|Z| = 120v/2,319 ohms

I= 52 ma

DANGER IS OVER! NO MORE MATH AHEAD!

"That's pretty close to what 'Early Bird' said it was. So, it looks like he was right and not tricking you, after all.

Oh, and one other thing. Notice that even though we rounded all the big numbers so they would fit into this freebie four-function calculator, we still got a pretty good answer. Don't give up on a problem just because you don't have exactly the right tool. Use what you have, a close answer is better than no answer – even on Early Bird's quizzes."

"Shuckydarn," moaned Hambone. "I guess this AC stuff is trickier than I thought."

"Well, Hammy, if it's any consolation to you, there is a ham radio application of this exact problem.""I don't see how this old relay and big capacitor operating at 60 Hertz is ham radio stuff?""Simple, reverse the problem. Let's say you have an antenna that's too short for the frequency you want to use it on."

"You mean like a mobile whip on HF?"

"Exactly," continued Elmer. "How would you make it work?"

"I would put a loading coil in series with the whip at its base to get rid of its capacitance. That way it would be a closer match to my coax."

"That's right," said Elmer. "But some hams, especially those living in very dry climates, say that wind blowing on the antenna can create noise from static electricity that discharges through the radio. A solution is to put the loading coil in parallel with the antenna. That way it provides a path to ground for the static electricity so it doesn't pass through the radio."

"I don't get it," said Hambone.

"In your exercise, just think of the capacitor as the load, and you apply inductance (in the form of the relay) to cancel some of that capacitive current. It's the same as an antenna, only the frequency and part values are different. The principle is the same."

Oh yeah," said Hambone as a small light started to come on in his head.

>> JCRAC FEEDBACK <<