

# The PROPAGATOR

July, 2003

The Monthly Newsletter of South Orange Amateur Radio Association

## July Meeting & More

Featured at the July meeting will be a Q & A session with the new and growing Elmers group. Expect a lively give and take where all questions are acceptable and there will be a lot to learn. We have some very competent members to call on for advise.

Reports from Field Day will be presented, including some very nice video clips the club can use in promotions.

Here are some of the other events of interest that are coming up in the near future:

Fort Tuthill hamfest at Flagstaff, AZ. [7/25-27]  
Information at

<http://www.arca-az.org/arca/>

SOARA Picnic at Dana Point Harbor [8/2]

ARRL Southwestern Convention at the Hilton  
Long Beach, Long Beach, CA [9/5 - 7]  
Information at [www.hamcon.org](http://www.hamcon.org)

There is a county wide RACES drill on September 13. Participation is through the local emergency groups. If you are interested in joining one of the groups, contact the radio officer of the group or contact Ray, AE6H, for information.

New license classes are being planned and the schedules will be announced soon. Consult SOARA's web site for the latest news and announcements.

## New Members

A hearty welcome to SOARA's newest member:

Steve Leander      KG6OYK

**Field Day:** As you may already know, Field Day 2003, was a great success. While we don't have our final scores tallied yet, and, we have no way of knowing how the other groups in our class scored, nevertheless, we had such good turnout and participation, that the stations almost never were idle when the appropriate bands were active. I believe that this will contribute to SOARA having a very high rating. Set up and take down were very smooth, the food was great, we had good press coverage, and lots of visitors. Most important, I think everyone that participated had a good time.

**Lost and Found:** As always, when cleanup was finished we came up with a few "surplus" items that we are anxious to get back to their owners. They are: a fabric folding chair, an MFJ antenna analyzer, a screwdriver, pliers, a pair of leather gloves, and a set of headphone adapters. These items will be at the next meeting for claiming. If you cannot attend, but think one or more of these items may be yours, please e-mail me with a brief description of the item, and I will make arrangements to unite you with your item.

**Orange County Fair Booth:** SOARA has committed to staffing the OCCARO Amateur Radio Booth at the O.C. Fair for two days: Thursday, July 17, and Tuesday, July 29. While we have all the time slots covered, there are still opportunities to help if you are interested. Check with me for details and to get your free ticket and parking pass.

**SOARA Picnic:** Saturday, August 2, is the date for the annual picnic. Always a fun event for the entire family, mark your calendar and plan on arriving about 10:00 AM. The location is Baby Beach in Dana Point Harbor. Talk-in is on the SOARA 147.645 repeater. See you there.

**Jackets:** I still have several SOARA jackets to deliver, and I will have them at the meeting. Again, if you cannot make the meeting, but ordered a jacket in the first batch, please e-mail me so we can get it to you. Our second order is going to be delayed a few days, so there is still time to order one if you haven't already. My hope is that with the advent of warmer weather, folks won't mind waiting a bit longer.

**On the subject of jackets:** Please check your car, trunk, or coat rack to see if you have an extra SOARA jacket. I'm in search of one that wandered off from Field Day. It can be identified by the call AE6H and the name Ray embroidered on it. Since the jackets all pretty much look alike, I'm guessing it went home with someone by mistake. Please check and let me know if you locate it.

73, and have a good summer from Ray, AE6H



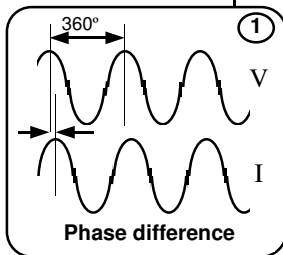
### The Way I See It: Understanding Radio Theory Without Math.

In previous columns we have discussed antenna tuners. In this column we will look at them in terms of the components used and try to get a handle on how those components do their job.

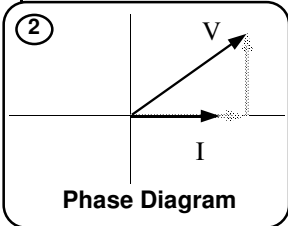
Start with the notion that any circuit may be considered a

combination of a resistance and a reactive component (capacitor or inductor). The conditions under which this is valid are:

we consider only one fixed frequency, and the circuit is linear and time invariant. Most important for us is the fixed frequency requirement — as in “My antenna tuner is adjusted for 1:1 SWR.” If you change the frequency, that is no longer true.



Phase difference



Phase Diagram

We can completely specify what impedance we “see” by indicating the resistance R

and reactance X (or  $jX$  if that

notation is comfortable). Both of these quantities are measured in ohms, or volts per ampere. If we force a current of one ampere and measure the voltage produced, we will have a measure of the impedance. In general, there will be a phase difference between the voltage wave and the current wave.

Figure 1 is a diagram of the voltage and current waveforms. You can see that there is a phase difference between the waves.

Figure 2 is a simple diagram which allows us to represent the phase difference in an easily understood form. The length of the arrow indicates the voltage or current value and the direction indicates the phase. We are free to choose the direction of one of the arrows; it is the

difference in the directions that is significant.

Choose the direction of current (I) along the right hand horizontal axis. In figure 2 the voltage arrow is shown as the sum of two arrows, one along the direction of the current arrow and one at right angles. The first of these voltage components is due to the resistance R and the second is due to the reactance X. We see immediately how this is a measure of those two components. The R value is just the in-phase component of voltage divided by the current, and the X value is the  $90^\circ$  component of the voltage divided by the current.

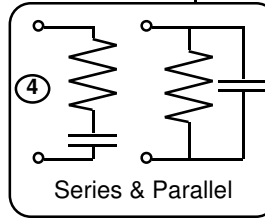
Figure 3 is a representation of an impedance. Let me remind you again that this is for just a fixed frequency. Any impedance can be represented by a point on this R - X plane. The distance along the horizontal axis and the vertical distance give us the R (we won't run into any negative resistances!) and the X (negative is capacitive and positive is inductive) values. If we have measured the voltage and current for a two terminal circuit and the phase between the two waves — there is nothing else to measure — we have all the information about the behavior of the circuit (at the frequency in use).

A circuit having resistance and capacitance will result in a point in the lower right hand side of the R X plane. Figure 4 shows such a circuit. OOPS, it shows two circuits! How do we distinguish between them? The answer is we don't. We can have two circuits

combining these two type components as shown, but we can not tell which configuration is present by measurements at the terminals. (Again, we are only considering a fixed frequency.)

If we consider two circuits  $X_1 R_1$  (the series circuit) and  $X_2 R_2$  (the parallel circuit),  $X_1$  is not equal to  $X_2$  and  $R_1$  is not equal to  $R_2$ . That is important and while, perhaps not obvious, it is not difficult to see why. In the series circuit only a part of

the voltage is across the resistance while all of the current flows through it, and in the parallel circuit the entire voltage is across the resistance with only a portion of the current flows through it.



Series & Parallel

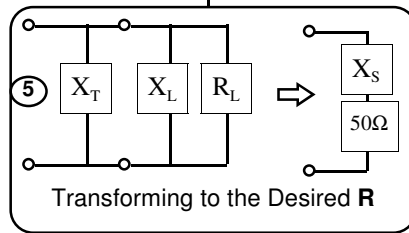
Enough background. Let's look at how we can make an antenna tuner.

Part of the above is to convince you that the feedpoint of an antenna looks like a simple circuit with a resistance R and a reactance X. Remember we only consider it at a fixed frequency, at another frequency it will exhibit a different R and X. Similarly, at the transmitter end, the transmission line it will look like a simple circuit with an R and X that we have to deal with. The R and X we see here are related to the antenna R and X

but are, in general, different.

We want to eliminate the reactance X and transform the resistance to  $50 \Omega$ . Getting rid of the reactance is easy.

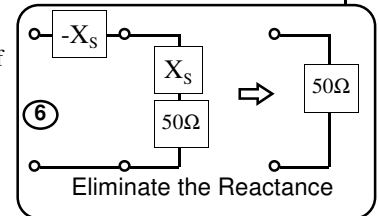
We just put an equal reactance with the opposite sign in series with the line. If the feedline looks like a capacitance, we put, in series, an inductor in series which resonates with the capacitance. We cancel it out.



Transforming to the Desired R

Changing the value of the resistance seen on the feedline is not as obvious but

just about as easy. Treat the feedline as if it were a parallel circuit and add the proper reactance. Now, recalculate this combined circuit (the R seen at the feedline and the X which is a combination of the feedline X and the X we added). If we choose the added reactance (X) correctly, we will have an R of  $50 \Omega$  and the combined X. Now all we need to do is eliminate the X component with a series reactance in our antenna tuner.



Eliminate the Reactance

I had two goals in mind in presenting the above material: first to clarify how an antenna tuner does its work, and remove some of the mystery; second, to build some background for a graphical tool for feedline and tuner calculations — the Smith Chart. We will look at that famous and useful tool next time. □

Year 2003	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
General Meeting 7:00 PM	27	24	17	21	19	16	21	18	15	20	17 Auction	No meeting
Program	W6XD	WD6DIH	W6PJ	N6NHP	Spring Auction	Field Day					Fall Auction	
VEC Testing 5:30 PM	27	24	17	21	19	16	21	18	15	20	17	—
Propagator Deadline	21	17	10	14	12	9	14	11	8	13	10	
Board Meeting	2/3	3/3	24	28	26	23	28	25	22	27	24	
ARRL Field Day						28/29						
SOARA picnic								2				
Fall Auction											17	
SOARA Holiday Party												7

### ON THE AIR

#### Operating Tips by John Walker, AC7GK

Once I was sent to a new customer on a referral to do a little 20-minute job in his shop. He liked my work so much that when I dropped by a couple of months later to make sure things were still OK, he cheerfully greeted me by name the instant I walked in. What a pleasure that was! The old adage seems to be true: "The sweetest music to a person's ears is the sound of his(her) own name."

We in ham radio can have the same effect on others. One way is to keep a list of people with whom we have visited on the air. It can be handwritten, but is best kept on a small

database, sorted by the last letters of the call sign. We can keep one near each radio we use, in the car, at home or with our HT, and can consult it instantly when we hear someone call. Then we can go back to them, calling them by name right out of the box.

Does it help? Everyone around us wears an invisible sign around the neck saying: "I want to be noticed." By using names, we let everyone know that they have indeed been noticed, and the enjoyment of ham radio by both sender and receiver is enhanced. □

The ARRL recently mailed a letter to hams regarding "Access BPL" — a scheme for using the power lines to provide high speed internet access. Pumping broadband noise over this massive antenna system sounds like a very real problem for radio communications.

Unfortunately, the FCC has looked favorably at the scheme. It will definitely hurt us and the ARRL is working to see that this service is not approved. It is a fight worth supporting. One of the most important services of the ARRL is representing our interests in Washington. They deserve your support. □

### UP-CLOSE & PERSONAL:

By Robin Whaling, KG6MCA

This month the focus is on Heiko Peshel, AD6OI, pictured here with his wife Patty, AD6OH. He has had his license 10+ years and has been a member of SOARA for about the same amount of time. Heiko, a hydraulic test technician at Parker Hannifin Corp. for over 26 years, enjoys organizing communications for special events that club members can get involved in such as mountain bike races, marathons, and triathlons. Heiko recently was net control in the Saddleback Memorial 1/2 Marathon and 5K Run in Laguna Hills in May.

*"Events like this are fun as well as an excellent test of operator skills and equipment. They help us prepare for major emergencies like wild fires, floods or 'the big one'. They also give us positive visibility to the general public and occasionally we even pick up new recruits."*

Heiko got involved in amateur radio through off-road racing in the mid-80's when a friend started a 50-mile off-road race, the San Joaquin Trail 50, where he was in charge of aid stations. According to Heiko, Patty had to become a HAM "in self defense" to keep up with all his activities! She also assists Heiko in organizing all the antennas he has collected over the years and keeps his



computer running.

Some of Heiko's other interests include biking, hiking, and traveling. Heiko and Patty just returned from a trip to the east coast where they visited WIAW, Hiram P. Maxim Memorial Station at ARRL Headquarters in Newington, CT. □

# The PROPAGATOR

South Orange Amateur Radio Association  
P.O. Box 2545  
Mission Viejo, CA 92690



## Meeting: July 21, 2003 at 7:00 PM Q & A With the Elmer Group

☛ **SOARA** meets at the Mission Viejo Community Center, 26932 Veterans Way, Mission Viejo, the third Monday of every month at 7:00 PM. Changes to the meeting time or place are announced in this newsletter and on the two-meter repeater.

☛ **License Exams:** Amateur License Exams are given prior to SOARA meetings. Exams are from 5:00 to 7:00 PM. Walk-in applicants are welcome. For information call Paul Levey, NZ1M, at 949-249-0121.

☛ **Contacting SOARA:** Questions about SOARA? Send e-mail to: [info@soara.org](mailto:info@soara.org), or leave a message at 949-249-1373.

☛ **Web Site:** SOARA maintains a web site with current club information. The URL is: <http://www.soara.org>.

☛ **Repeaters:** The SOARA 2-meter, 70 cm and 224.100 MHz repeaters are open to all licensed hams.

SOARA 2m — 147.645 – (110.9) Laguna Beach

SOARA 2m — 146.025 + (110.9) San Clemente

SOARA 2m — 145.240 – (110.9) Trabuco

SOARA 220 — 224.100 – (110.9) Laguna Beach

SOARA 440 — 445.660 – (110.9) Laguna Beach

The SOARA 220 and HROC 440 repeaters are shared by members of both clubs. Each machine is subject to the operating rules of its respective club. Call KG6GI for details.

SOARA 220 — 224.640 – (123.0) Santiago Pk. (C)

HROC 440 — 447.180 – (131.8) Santiago Pk. (C)

☛ **Nets:** SOARA 2 m repeater open net is held Tuesday 8:00 PM 40 meter HF net (7.268 MHz +/- for QRM), Sunday 7:30 AM.

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