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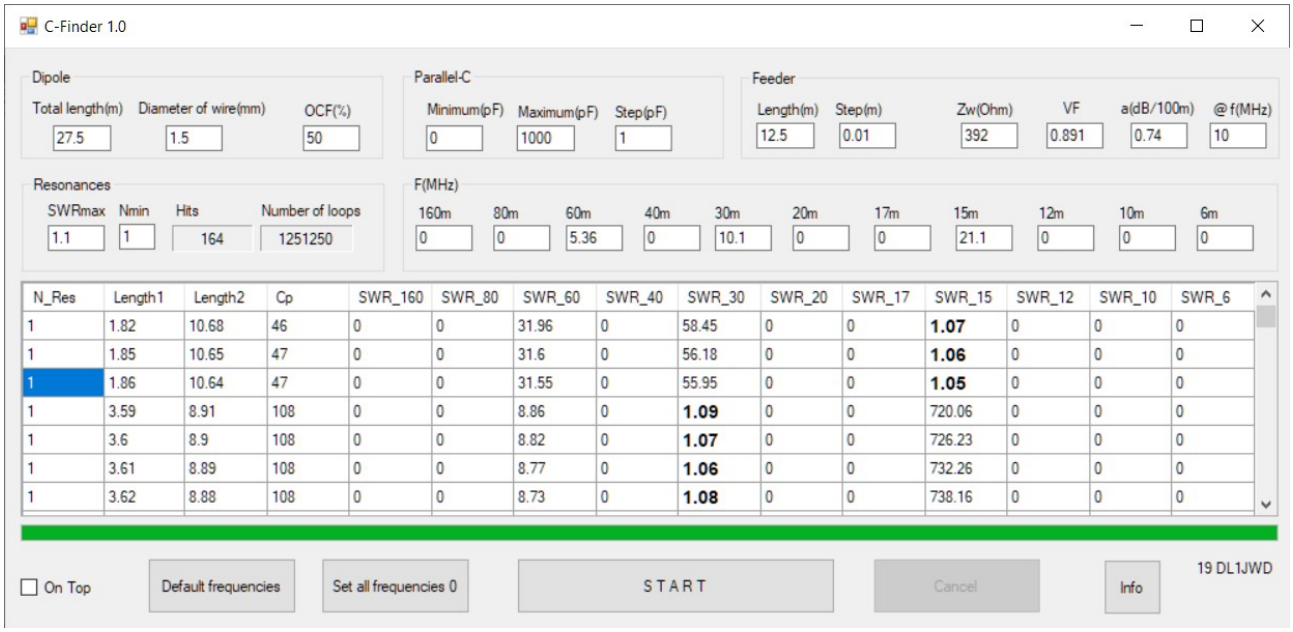
**The C-Finder - a tool for band extension of double-zepp antennas**

The well-known ZS6BKW "miracle antenna" has natural resonances on the bands 80m, 40m, 20m, 17m, 12m, 10m and 6m.
Here (except 80m) usually an antenna tuner can be dispensed with and a high efficiency can be achieved.

With so much light, there are of course also shadows, apart from the 160m band (the dipole is simply too short for this), the bands 60m, 30m, 15m do not work at all or only with very high adjustment losses.
However, OM Peter (HB9PMG) has shown that by connecting a capacitance in parallel at a certain point of the feeder, it is possible to create resonance for these "black sheeps" of the ZS6BKW.

In order to solve similar problems for any other double zepps, I have programmed this tool, which uses the same calculation kernel as the *18_MultiResonanceFinder*.
The calculation is done according to the trial and error principle (a fast PC makes it possible :-)).

The user interface should be essentially self-explanatory using as example our ZS6BKW:




At the top left, enter the dimensions of the dipole and the location of the OCF-input point,
to the right, the estimated range for the parallel capacitance and its change increment.
Next, we enter the data of the feeder (Wireman CQ553).

In the "Resonances" area, first enter *SWRmax*, the maximum allowable SWR at the feeder input.
"Nmin" denotes the minimum number of hits per result row.

We are initially satisfied with a single hit, because the found *Cp* should allow resonance at least for one band (later we can increase this value to 2 or 3 on a trial basis, but we usually also have to increase *SWRmax*).

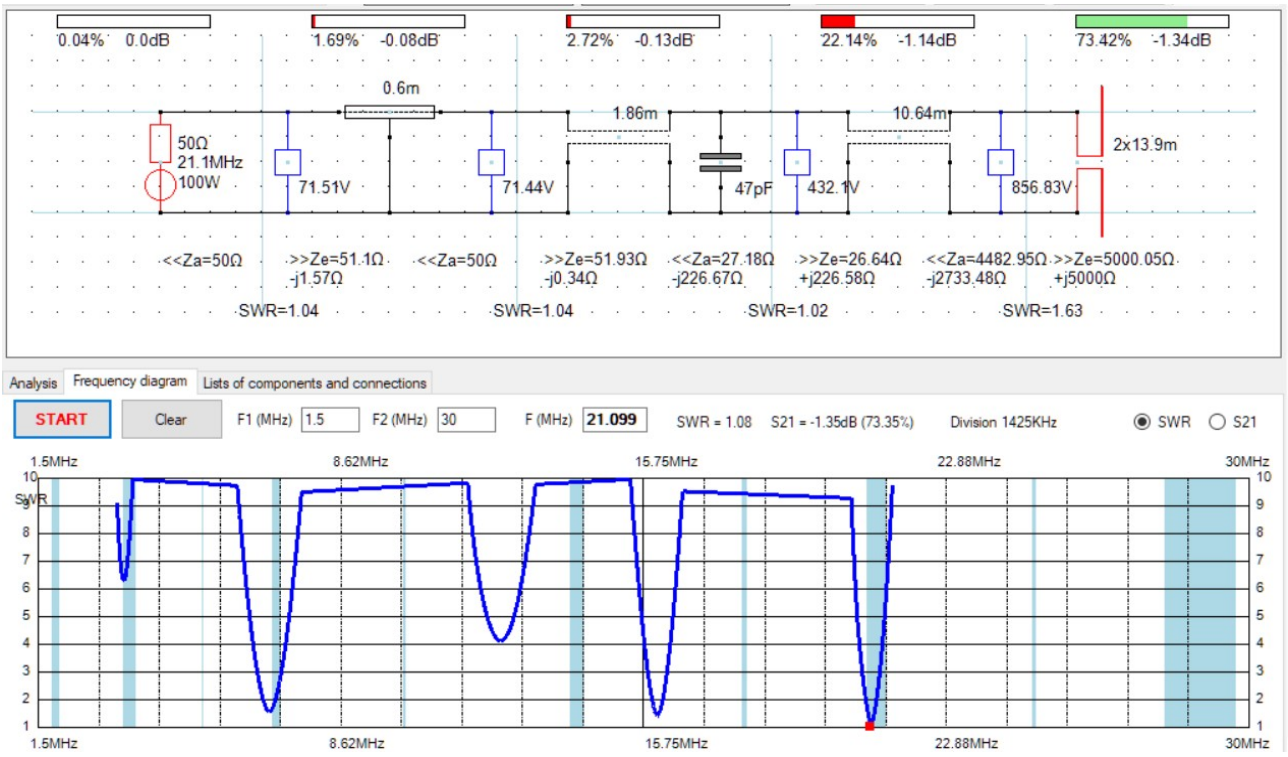
Since we are only interested in the 60m, 30m and 15m bands, we have entered zero in the "F(MHz)" range for the remaining bands.

After clicking on "START" it may, depending on the computer performance, take a few seconds until all possible combinations are processed and the result grid fills up.

**15m-band**

It can be seen that one achieves a SWR = 1.05 on the 15m band when the feeder with a capacitance of 47pF is bridged at a distance of 1.86m (from the transmitter side beginning).

We can check this in detail with the *16_SpecialNetworkAnalyser*:




We see that for 21MHz the dipole has a very high impedance (high voltage!) and that other resonances have been destroyed, but hardly anything has changed on the 80m and 40m bands.

**30m- and 60m band**

Also for the 30m band there are several solution variants, the most favorable shows a SWR=1.06 with a Cp=108pF at a distance of 3.61m.

After scrolling the grid, the results for the 60m band also appear, here the most favorable: SWR=1.03; Cp=143pF; Length1 = 5.53m.

**Practical experience**

Surprisingly, these are almost the same values as HB9PMG uses to expand the frequency of its ZS6BKW, its parallel capacitances are added via relays if required, whereby of course only a single Cp may be active at a time.

Among others, my friend Urs (HP9MPN) has also made his double zepp successfully used for the NMD (National Mountain Day) on the 80m band available for other bands with the *C-Finder* and other JWD tools.