



**ČVUT**

ČESKÉ VYSOKÉ  
UČENÍ TECHNICKÉ  
V PRAZE

# Subharmonický generátor B2M34IAS

**Petr Polášek**

**3.1.2018**



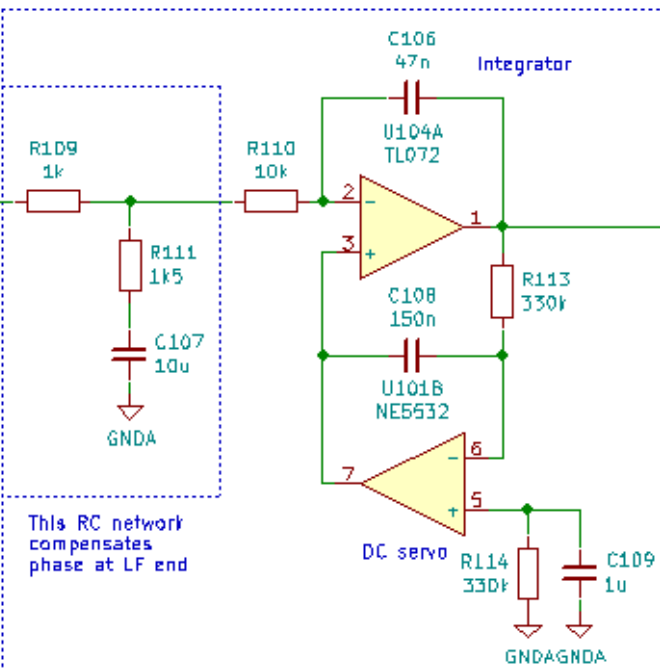
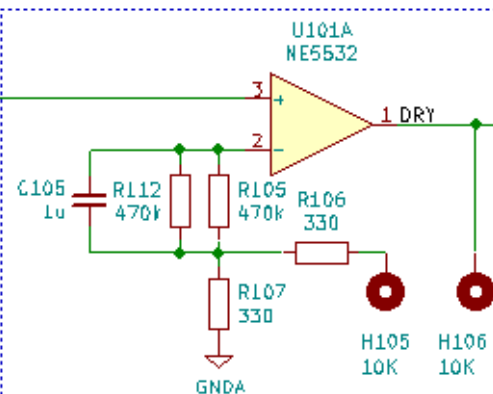
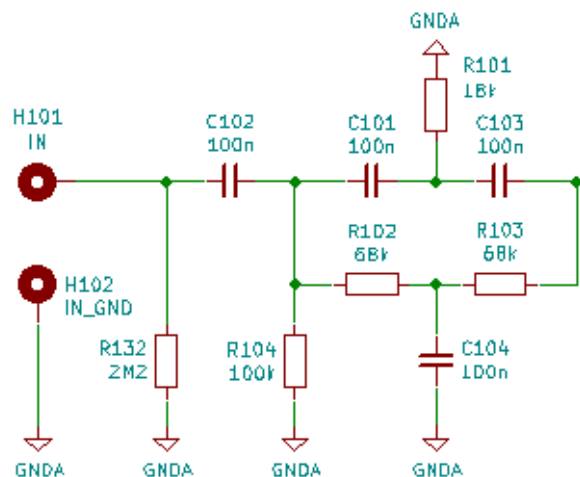
# Fázovací 90° článek - zapojení

Input HPF and 32 Hz notch filter to prevent saturation of phasing circuit. All capacitors should be linear.

Input amplifier

The 2 470k resistors are matched with the DC Impedance of the Input filter and help reduce DC offset. When changing the Input filter, change this input current compensation as well. The 1u capacitor can be of any bipolar type.

90 degrees phasing circuit (Integrator with DC servo and phase compensation at LF end)  
Maintains +90deg phase (+/- 0.25deg) from 67 Hz and higher.  
It has a "resonance" at 32 Hz which is the reason for notch filter on Input.  
The 47n and 10u capacitors should be linear, the rest is not so critical.



This RC network compensates phase at LF end

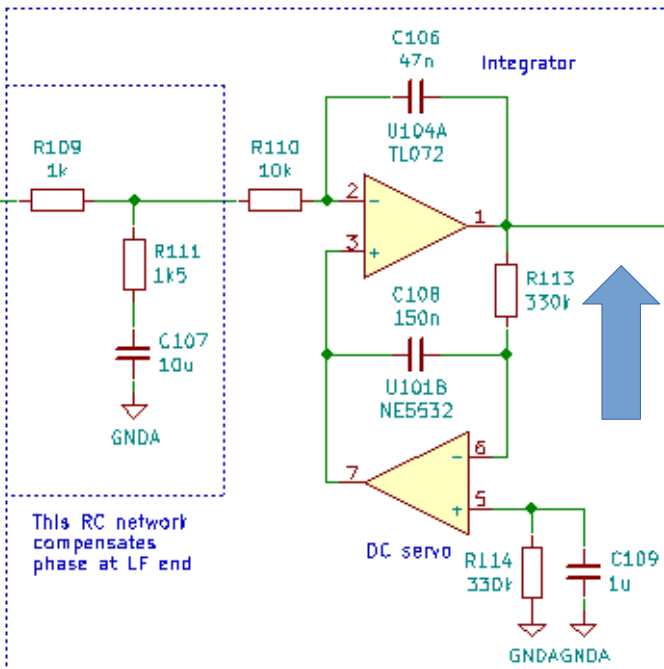
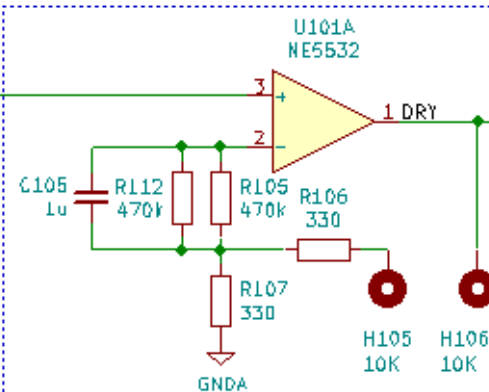
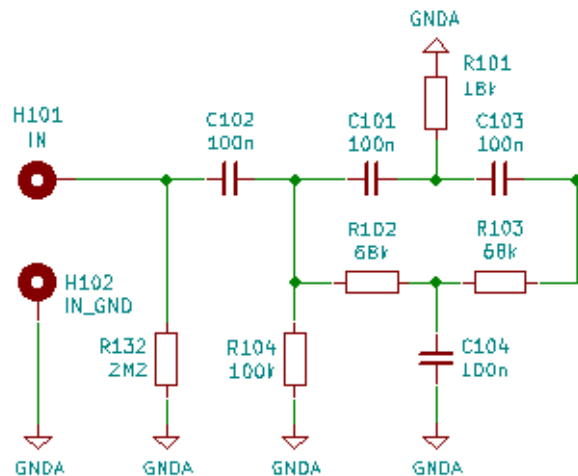


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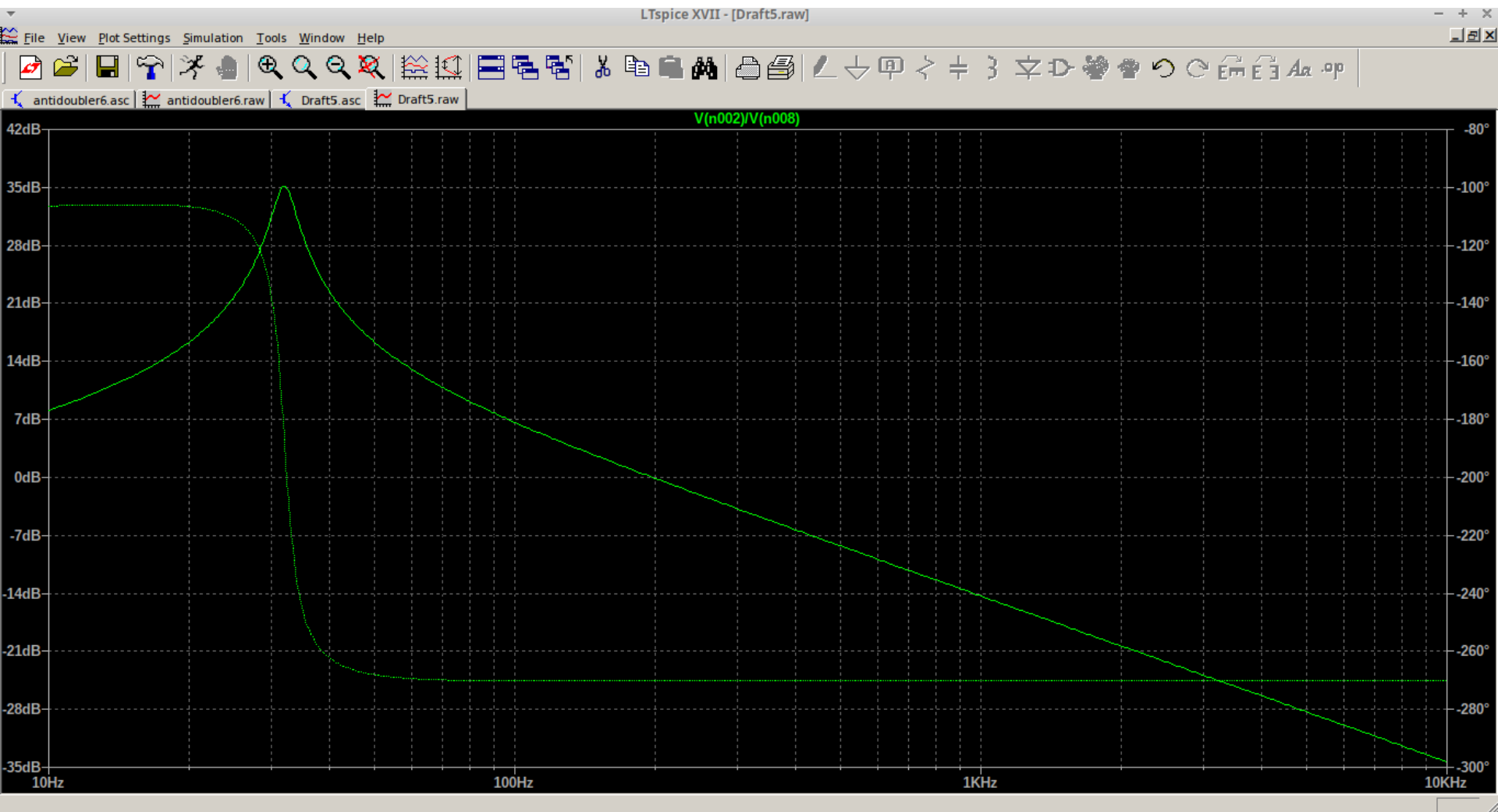
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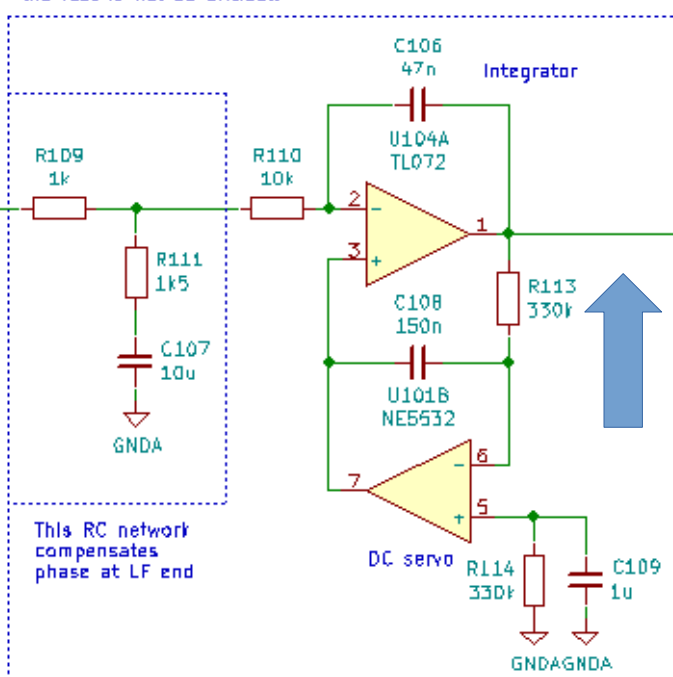


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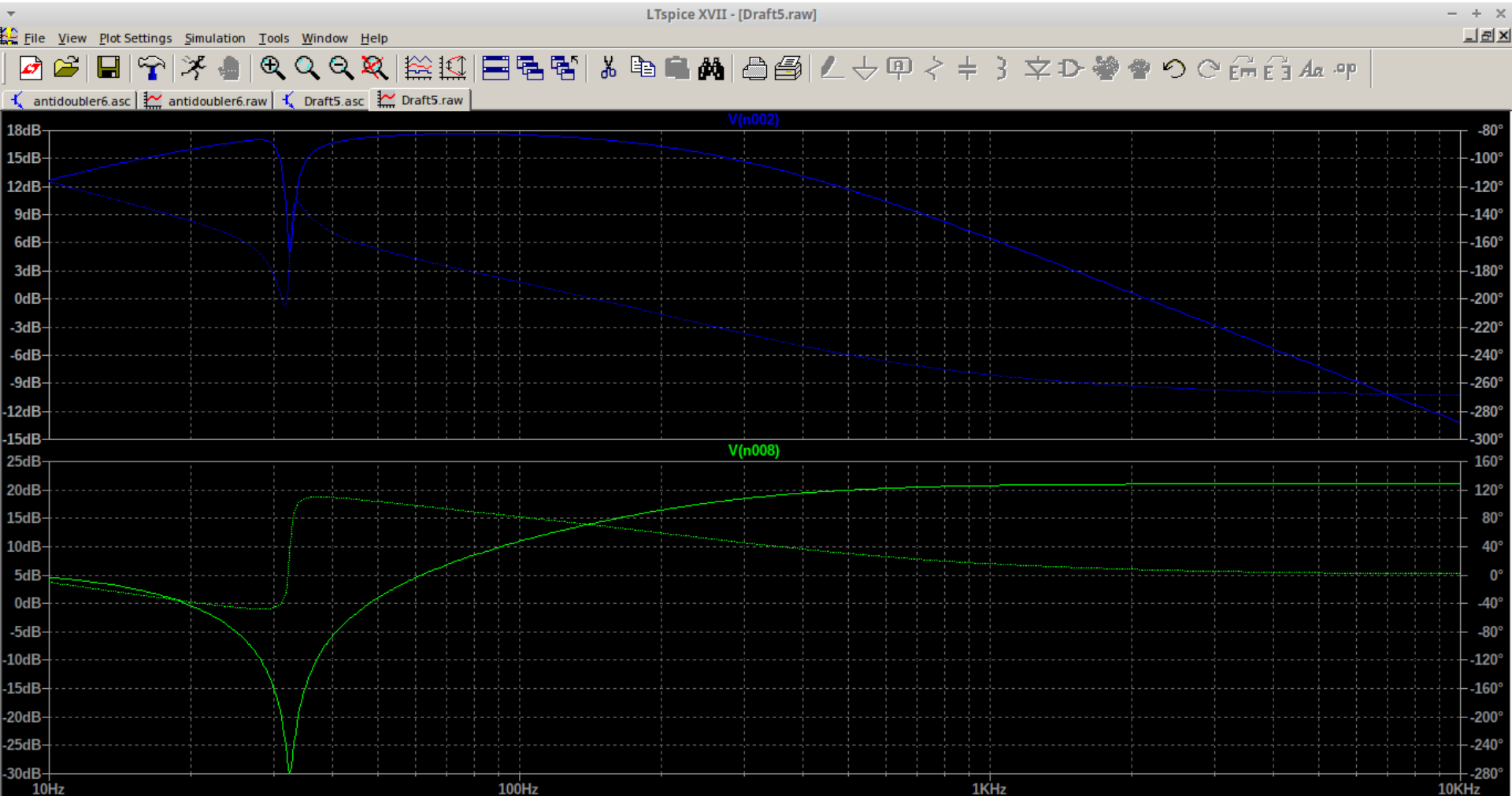
# Fázovací 90° článek - přenos



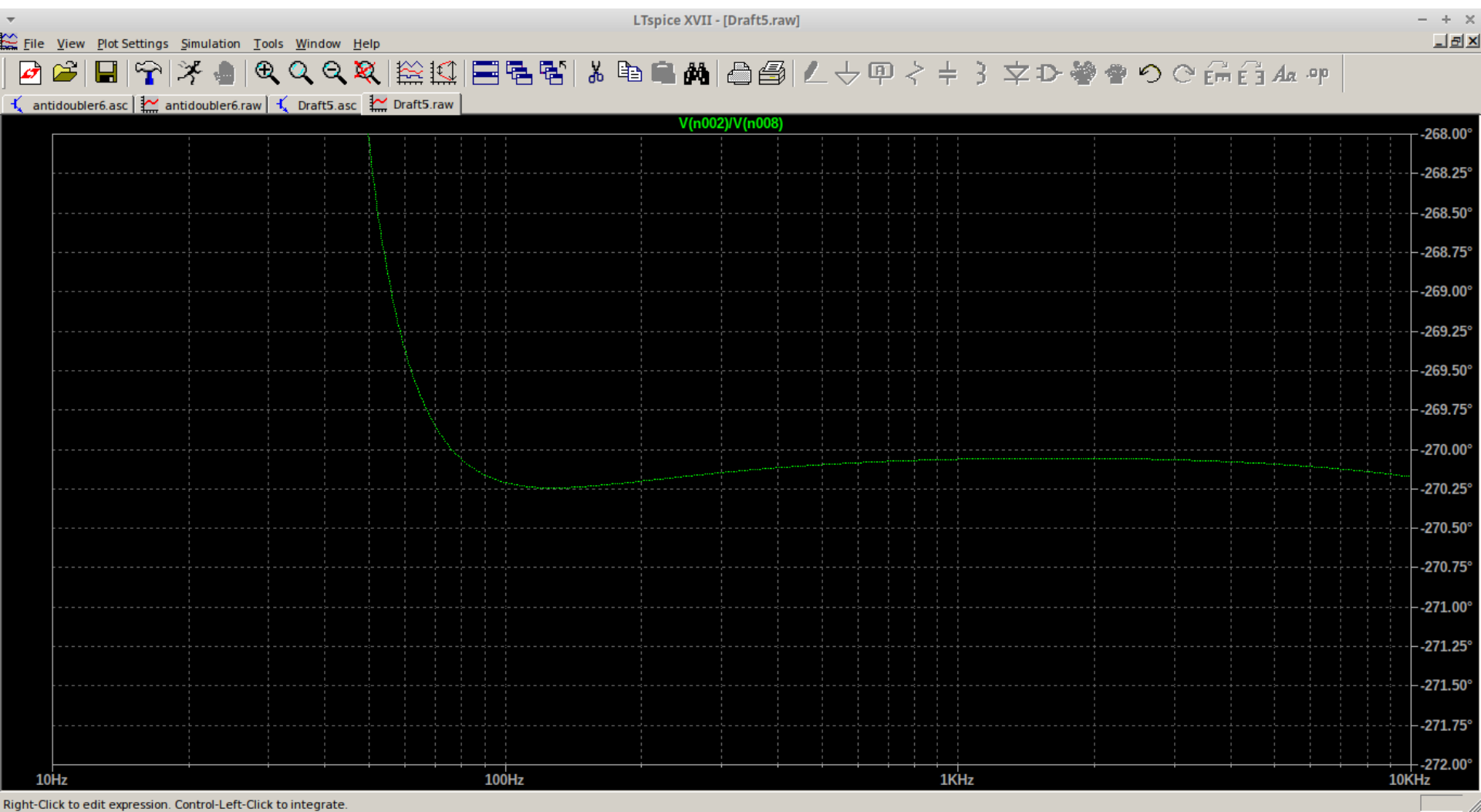
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# Fázovací 90° článek – celkový přenos



# Fázovací 90° článek – přesnost fáze



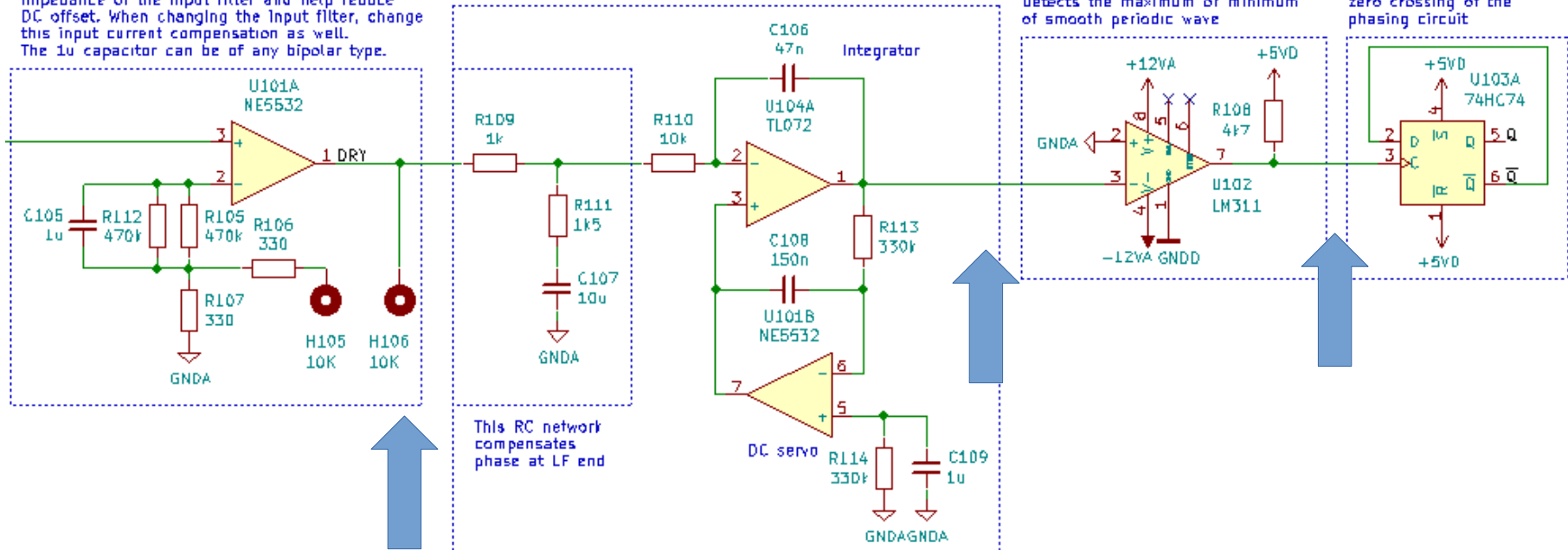
# Detektor průchodu extrémem - zapojení

**Input amplifier**  
The 2 470k resistors are matched with the DC impedance of the input filter and help reduce DC offset. When changing the input filter, change this input current compensation as well. The 1u capacitor can be of any bipolar type.

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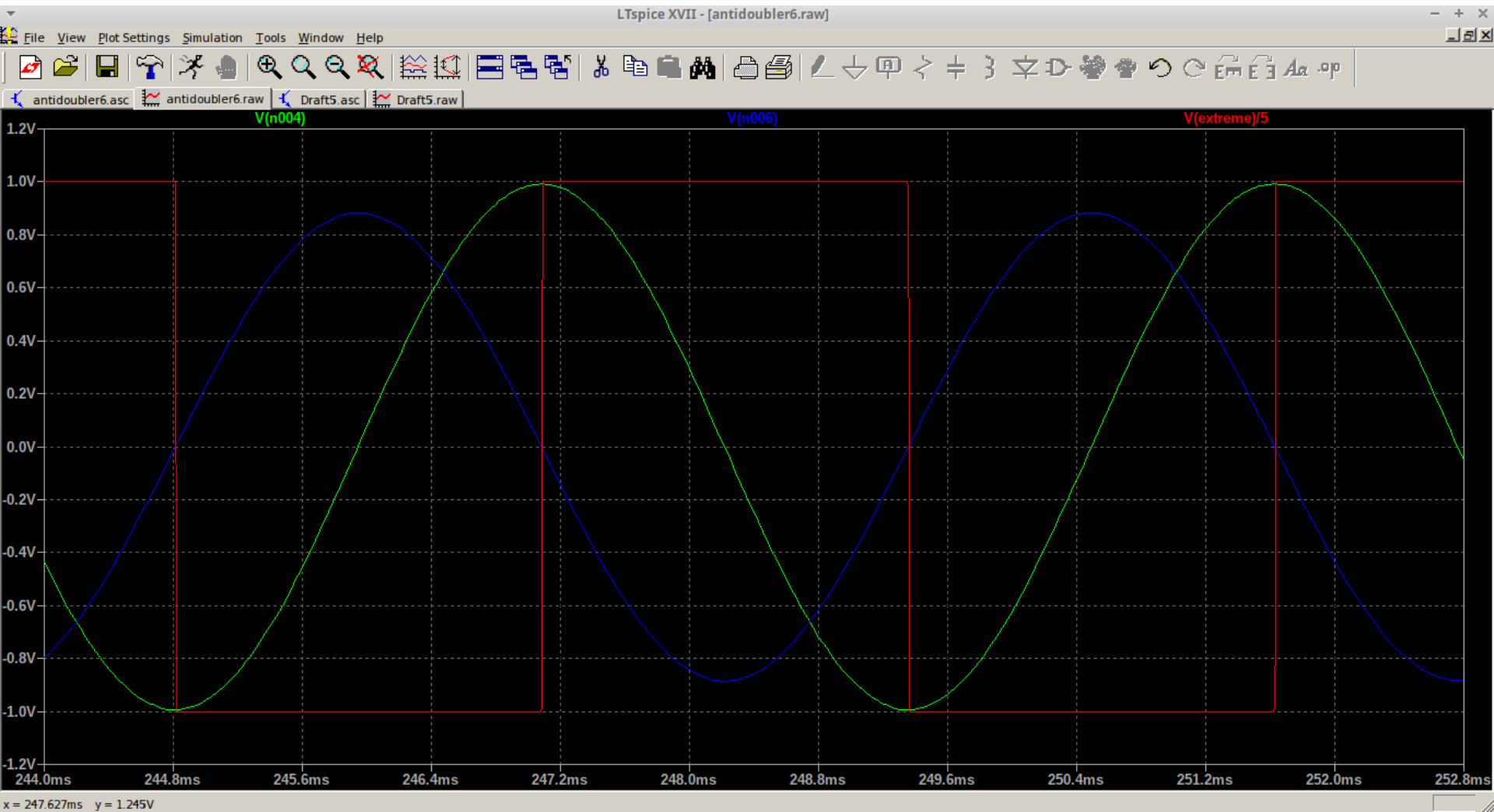
**Detector of zero derivation**  
Detects the maximum or minimum of smooth periodic wave

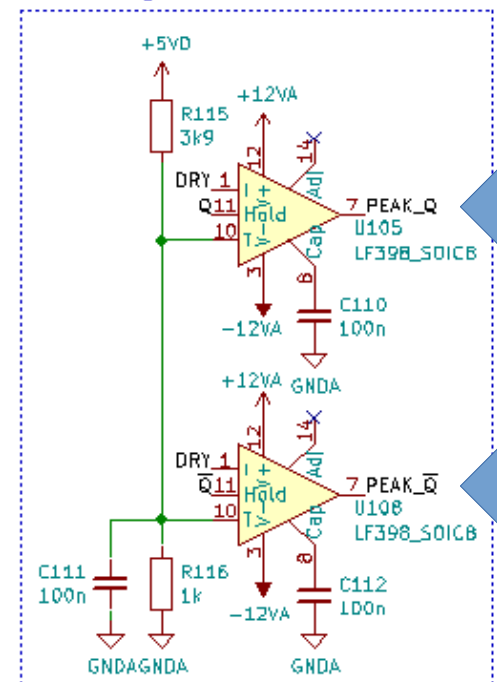
**Clock generator detecting zero crossing of the phasing circuit**



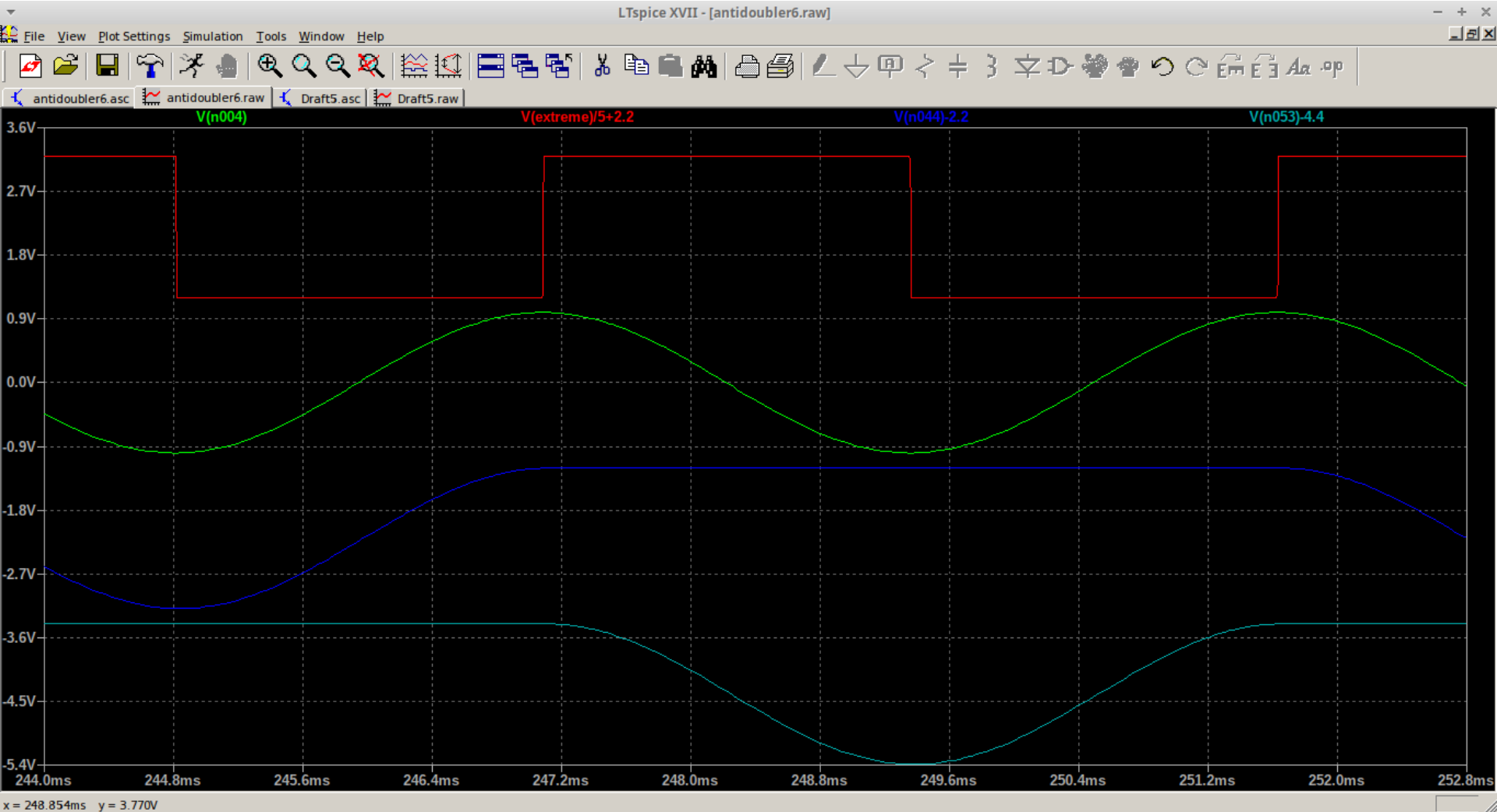


# Detektor průchodu extrémem - průběh

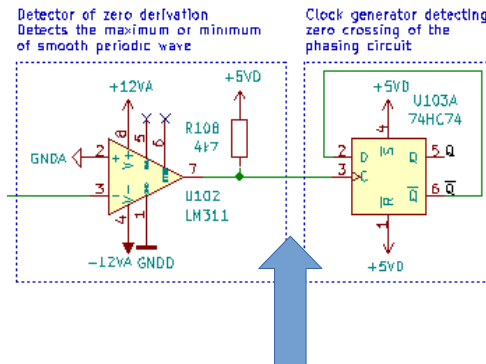




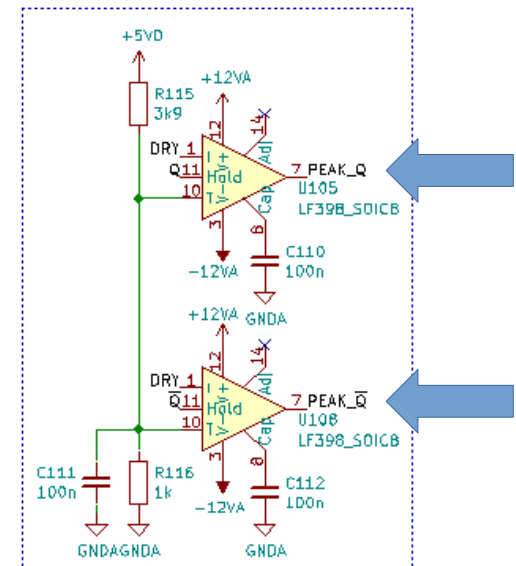
# Synchronní detektory maxima - průběhy



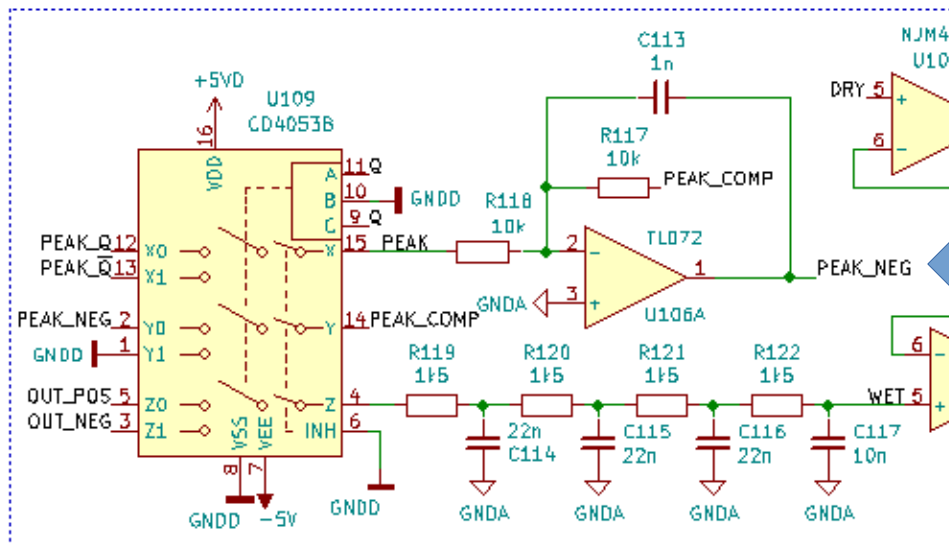
# Synchronní detektory maxima - zapojení



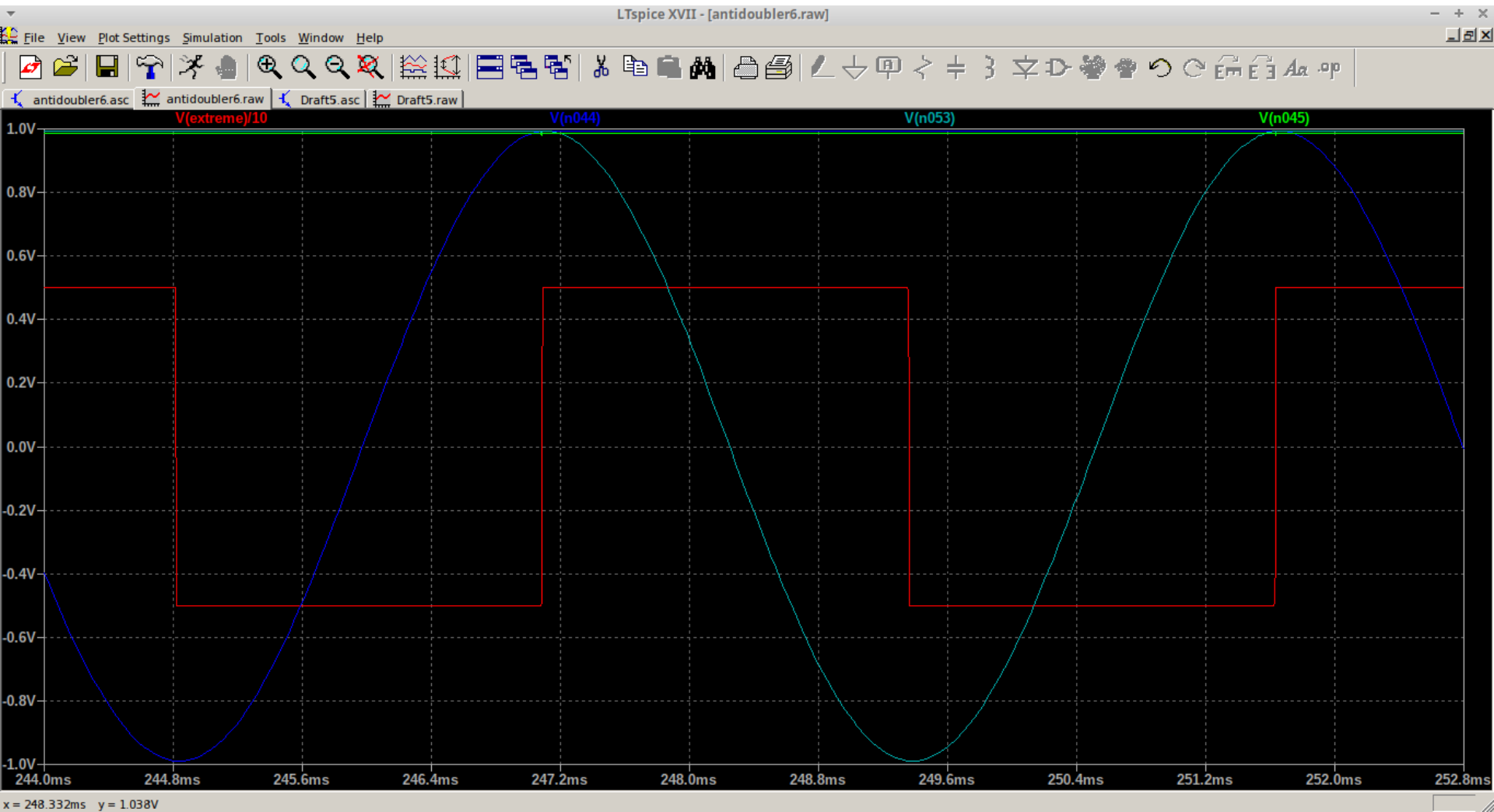
Peak detector, detects peaks synchronously by  
detecting zero crossing of the phasing circuit  
Capacitors can be of any type with low  
self-discharge.



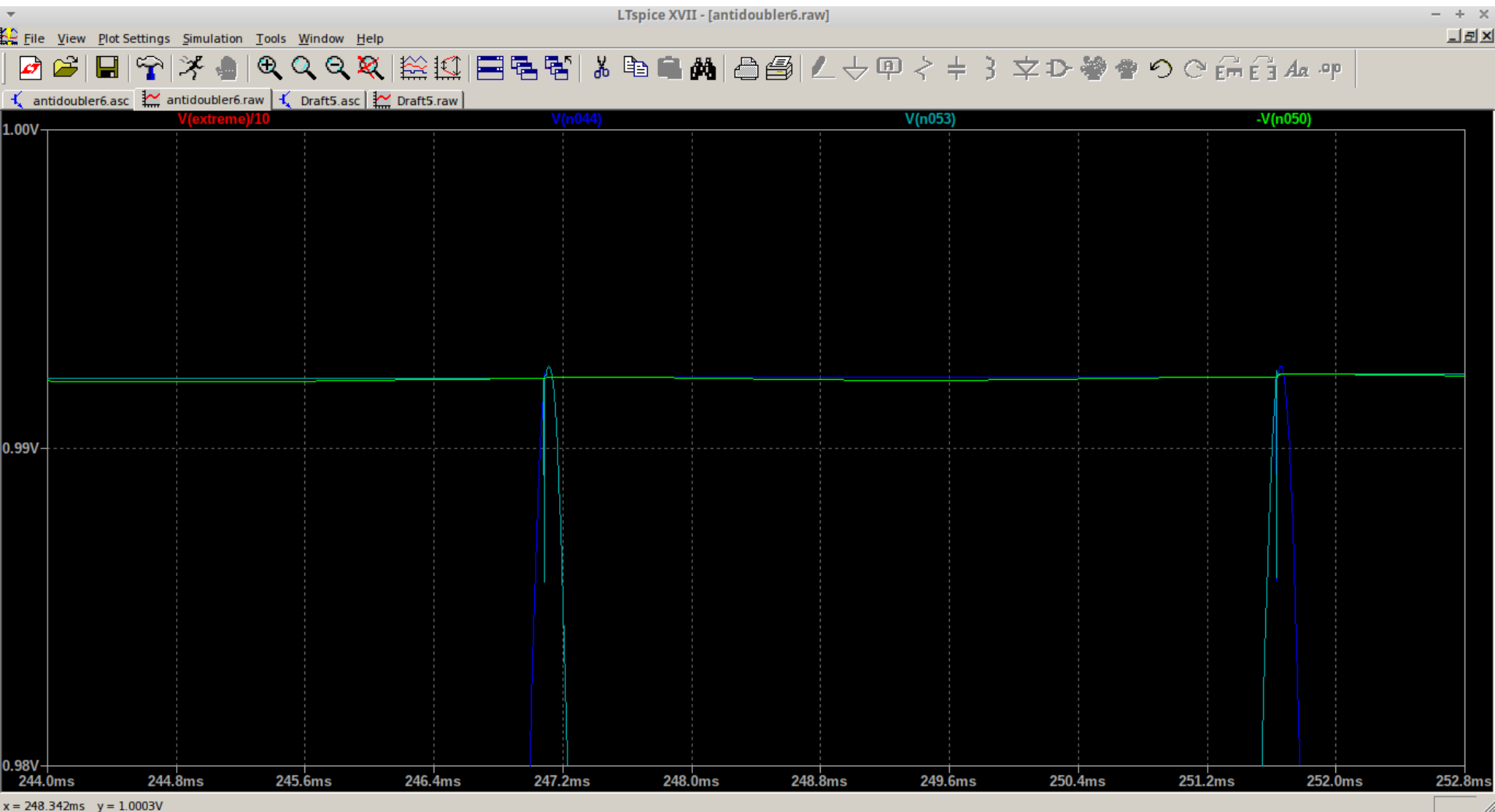
Analog switches which do most of the magic. Switch A switches between the two peak detectors  
Switch B serves as a "compensating" switch which reduces the effect of switch resistance on the  
Switch C switches polarity of the output waveform – required part of the transformation to half  
All capacitors should be linear.



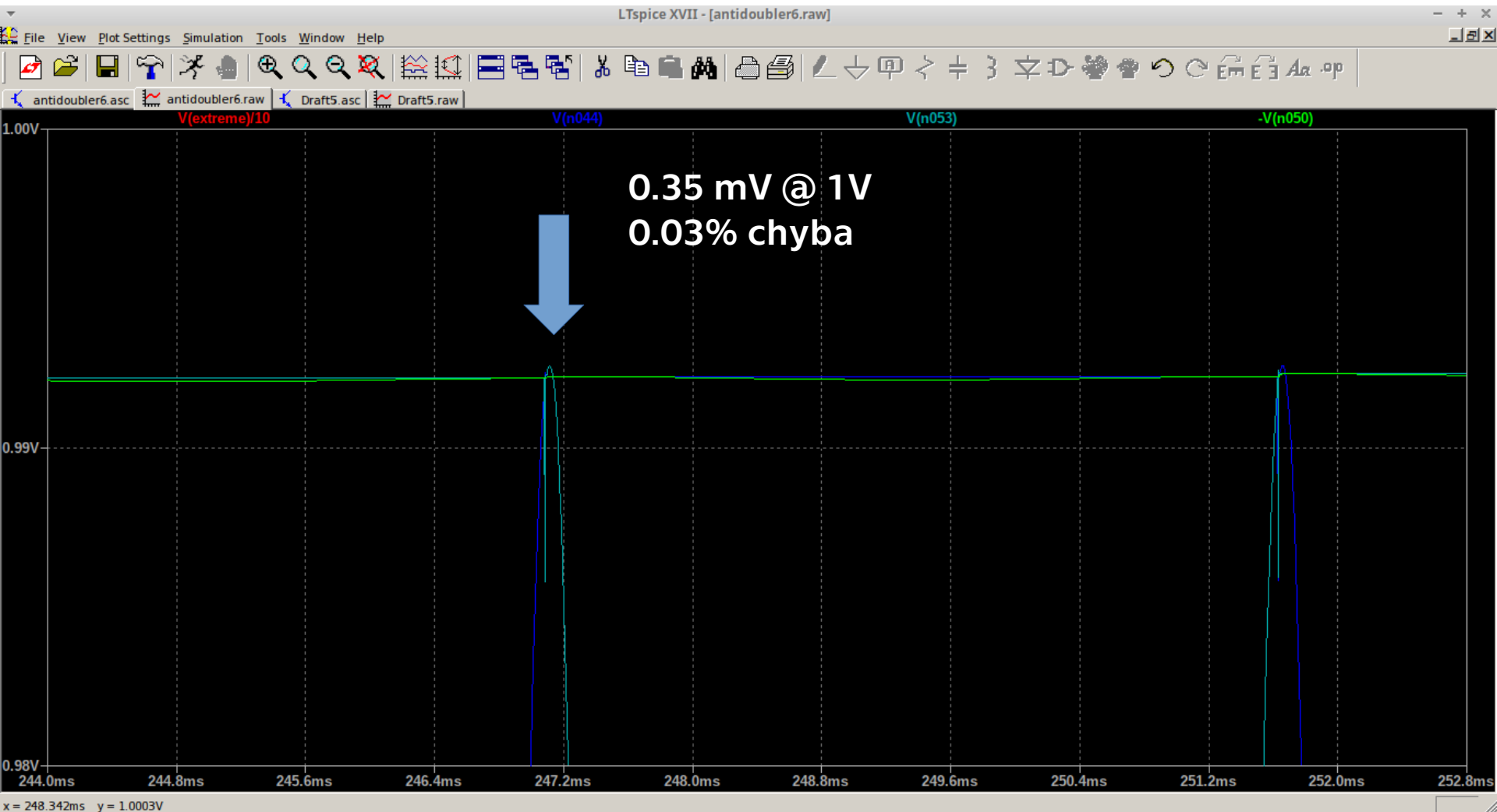
# Synchronní detektory maxima - průběhy



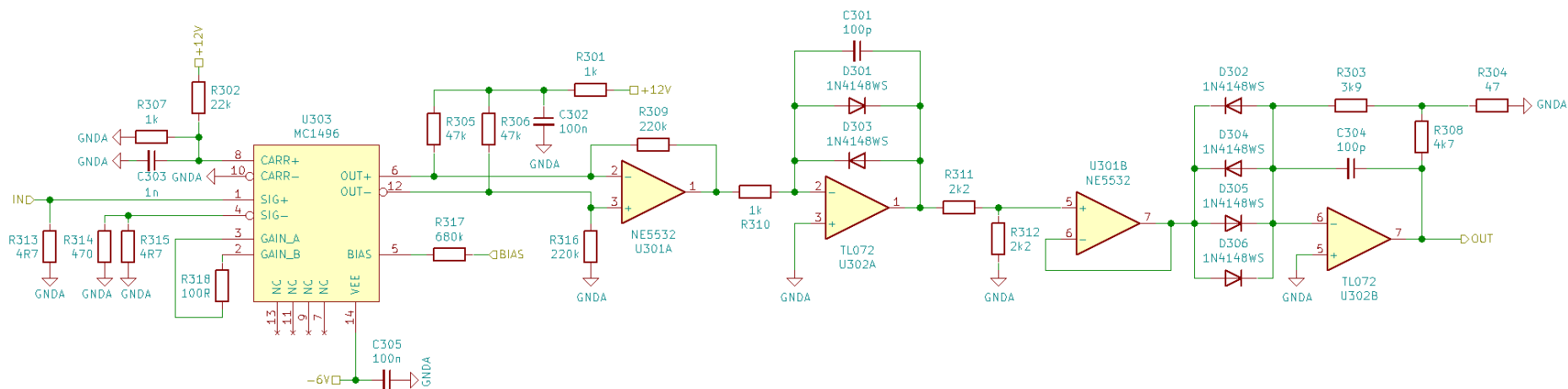
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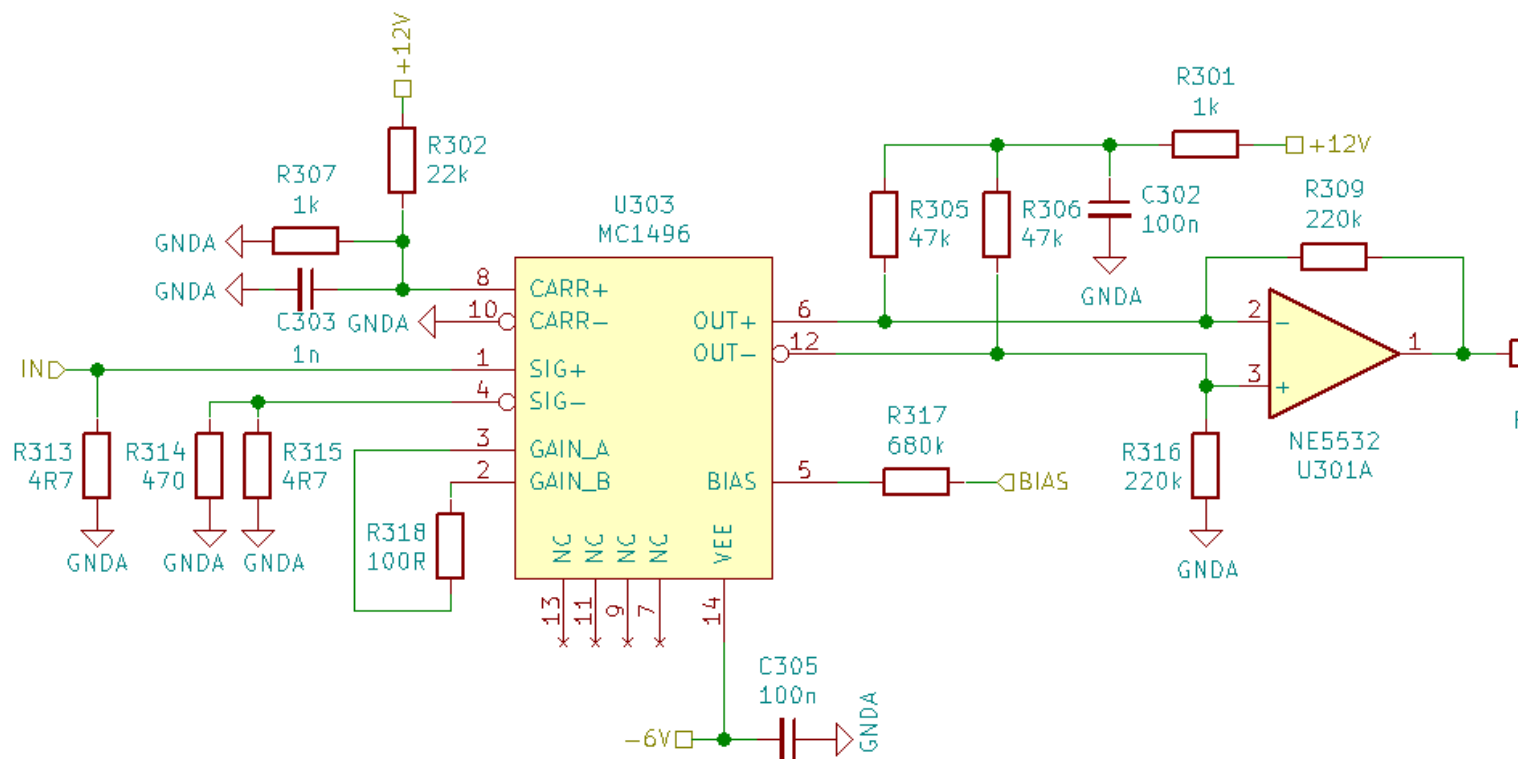
# Odmocňovací buňka - zapojení



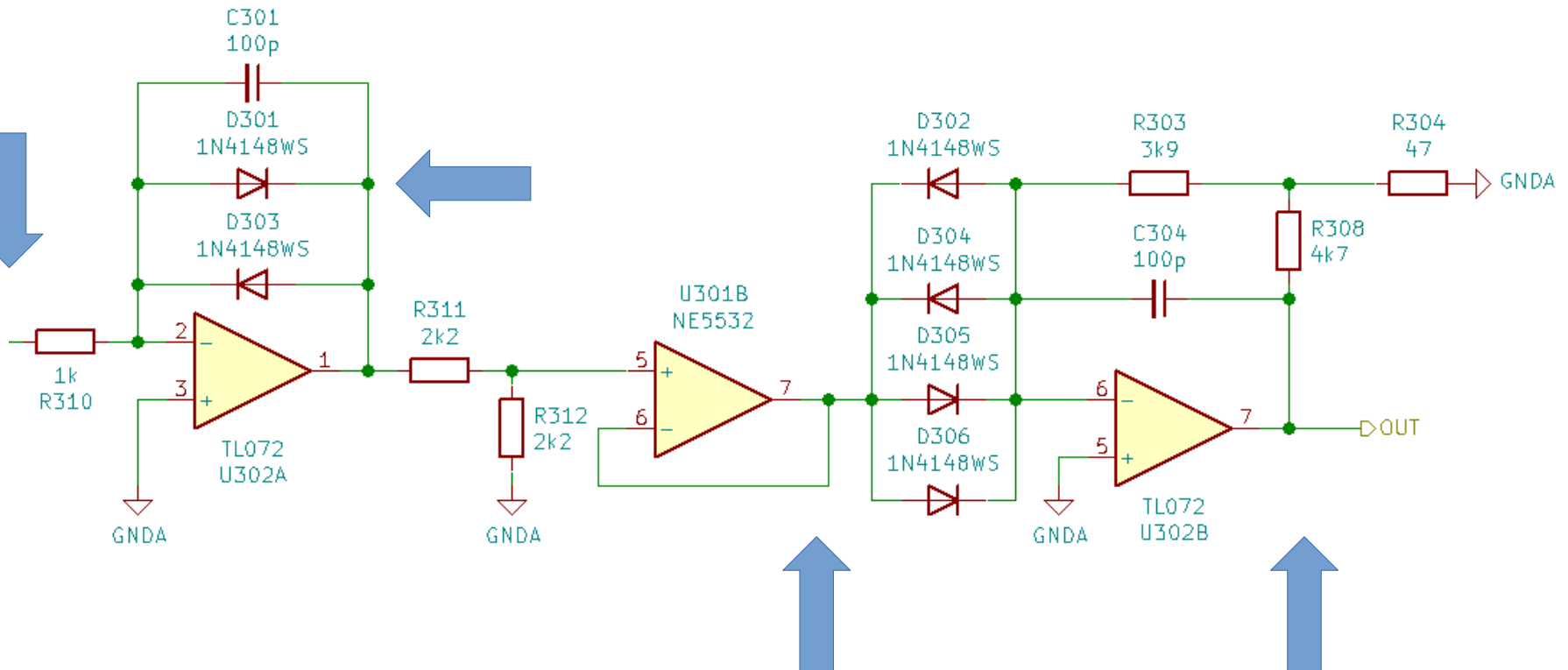




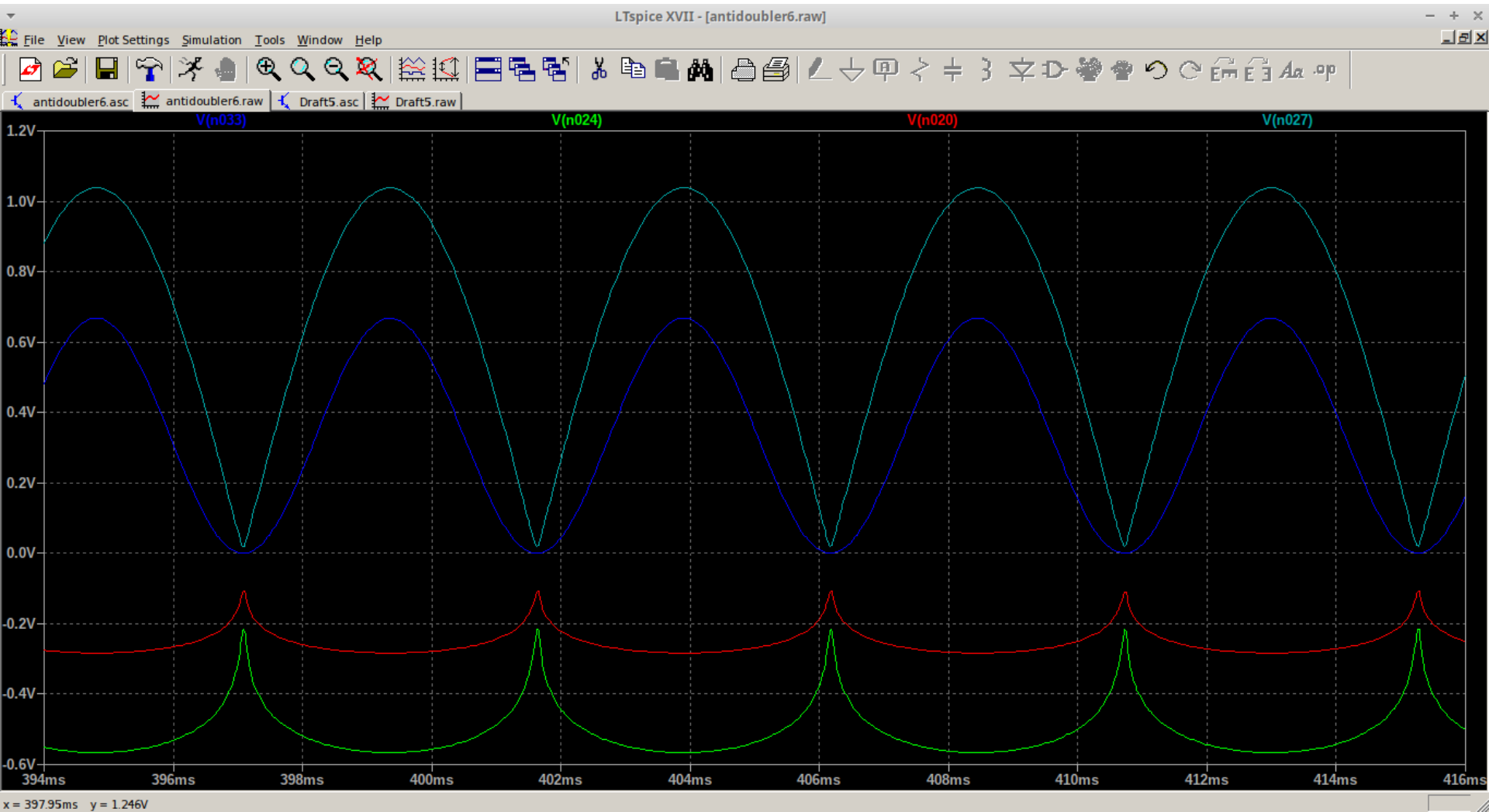
# Odmocňovací buňka – řízení zisku



# Odmocňovací buňka - odmocňovačka

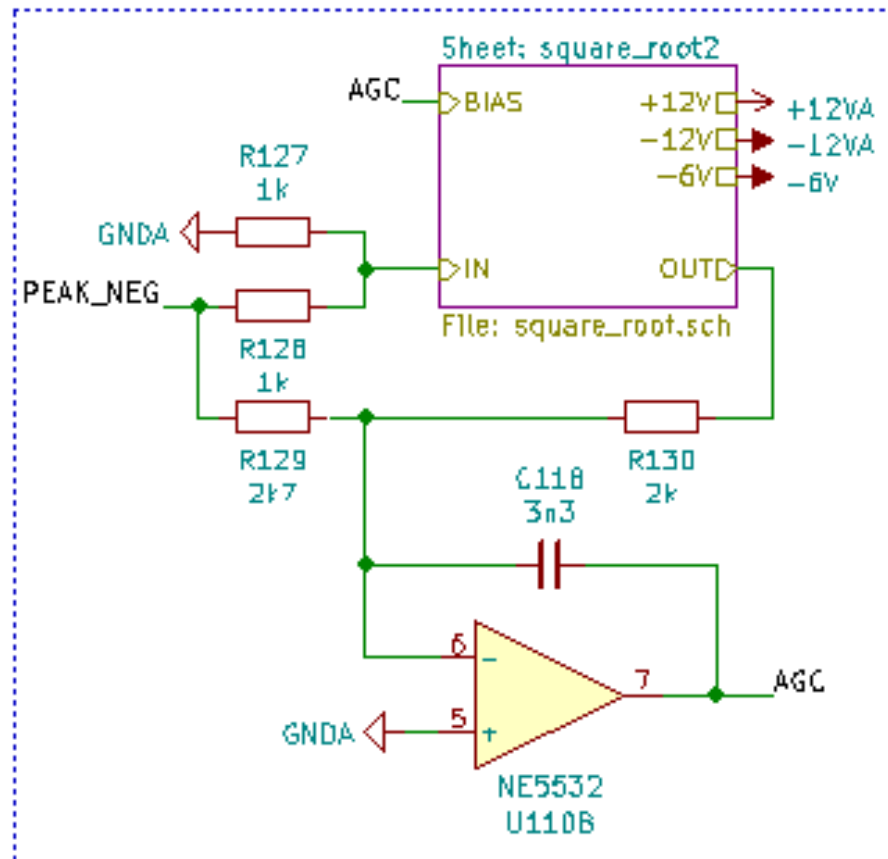


# Odmocňovací buňka - odmocňovačka



# Odmocňovací buňka – zpětná vazba

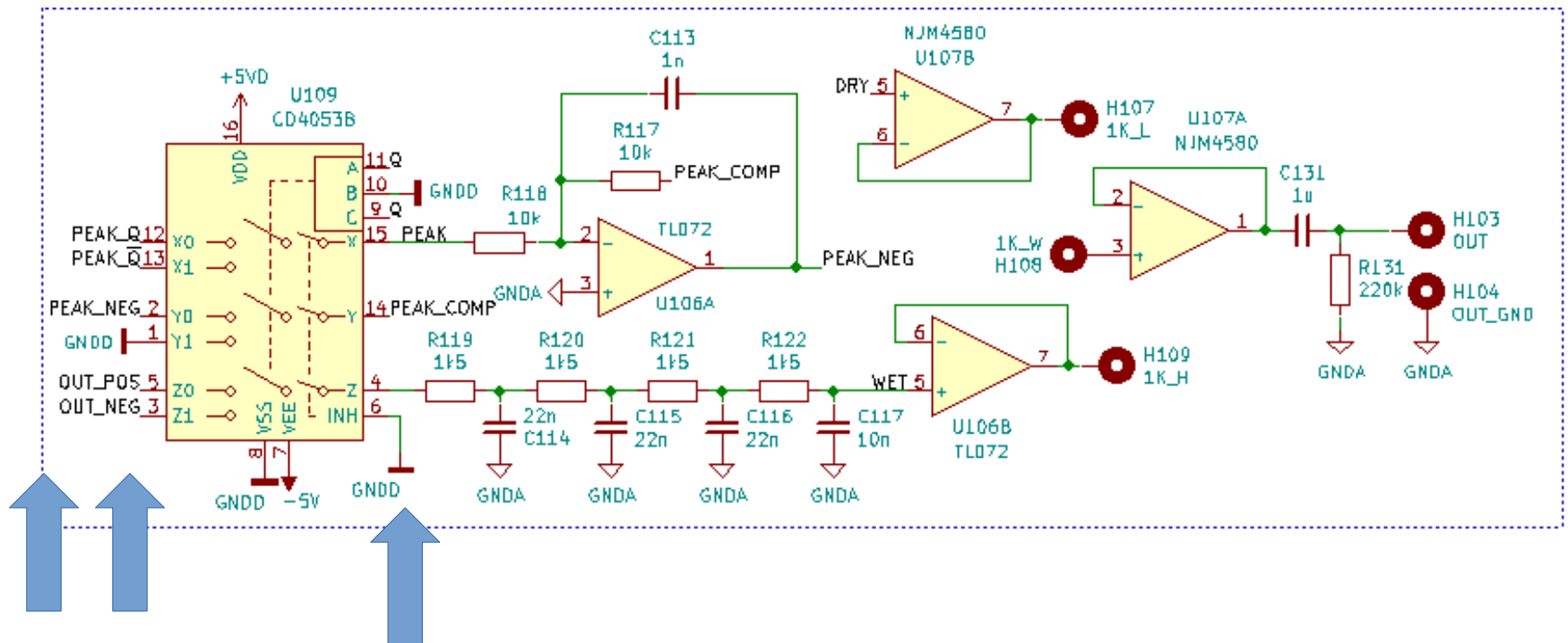
AGC circuit which computes gain for the main square root circuit. The capacitor is noncritical.



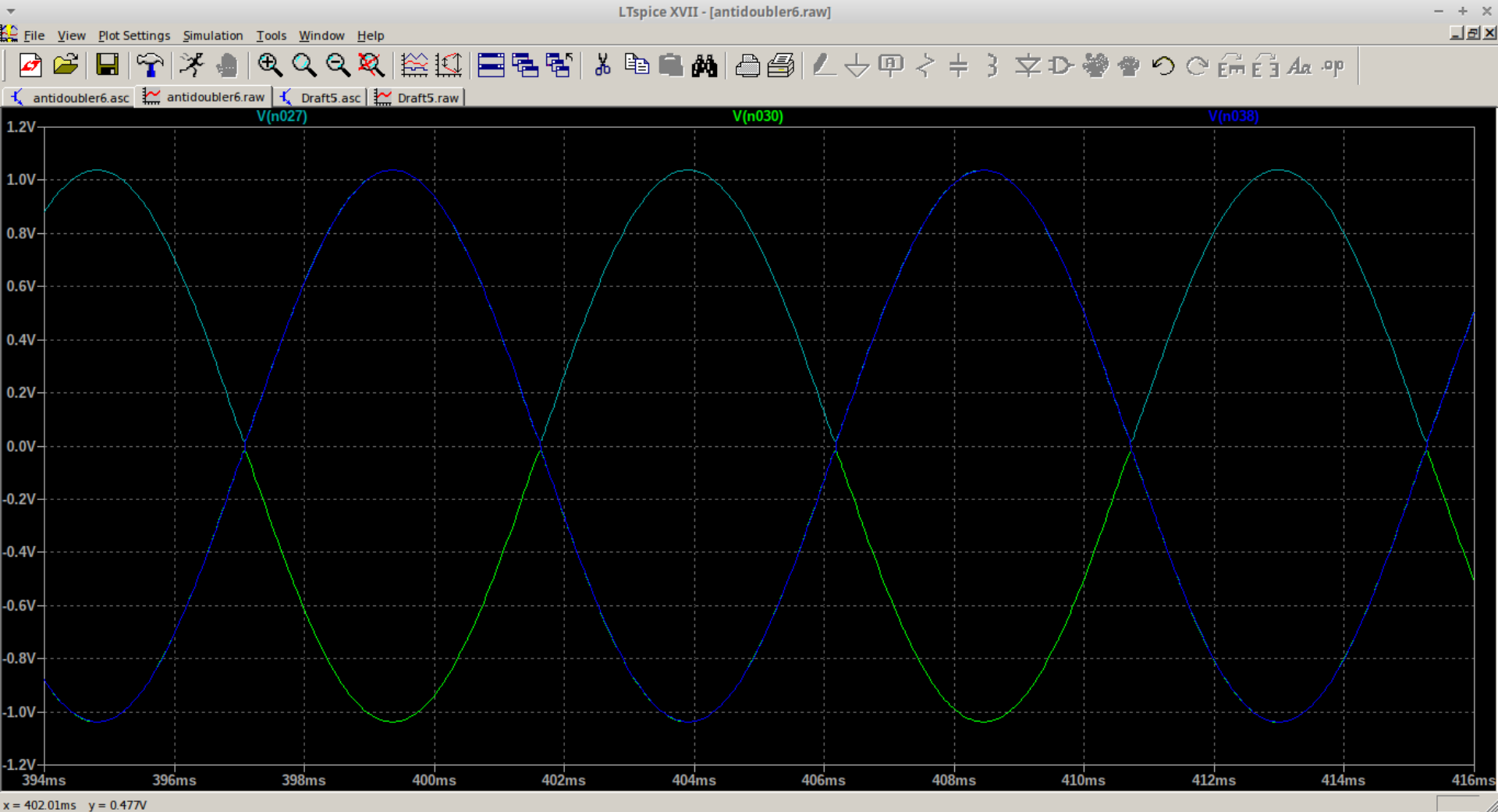


# Řízená inverze signálu - zapojení

Analog switches which do most of the magic. Switch A switches between the two peak detectors.  
Switch B serves as a "compensating" switch which reduces the effect of switch resistance on the performance of the inverting amplifier.  
Switch C switches polarity of the output waveform – required part of the transformation to half frequency  
All capacitors should be linear.



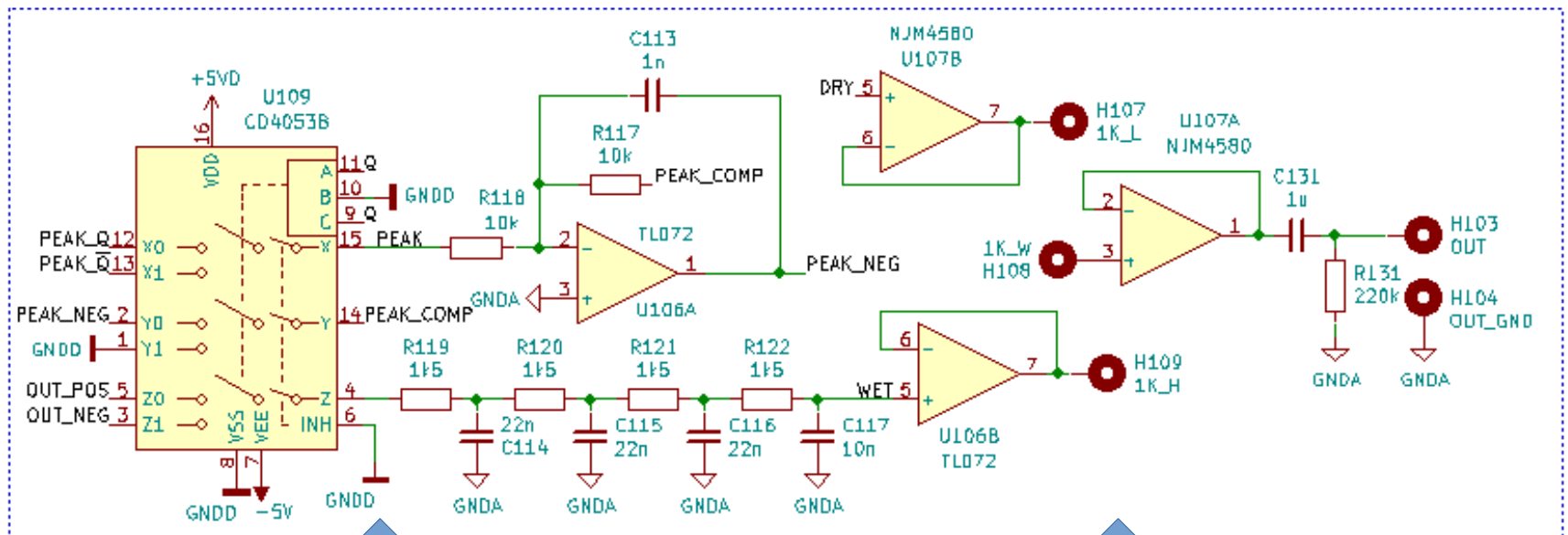
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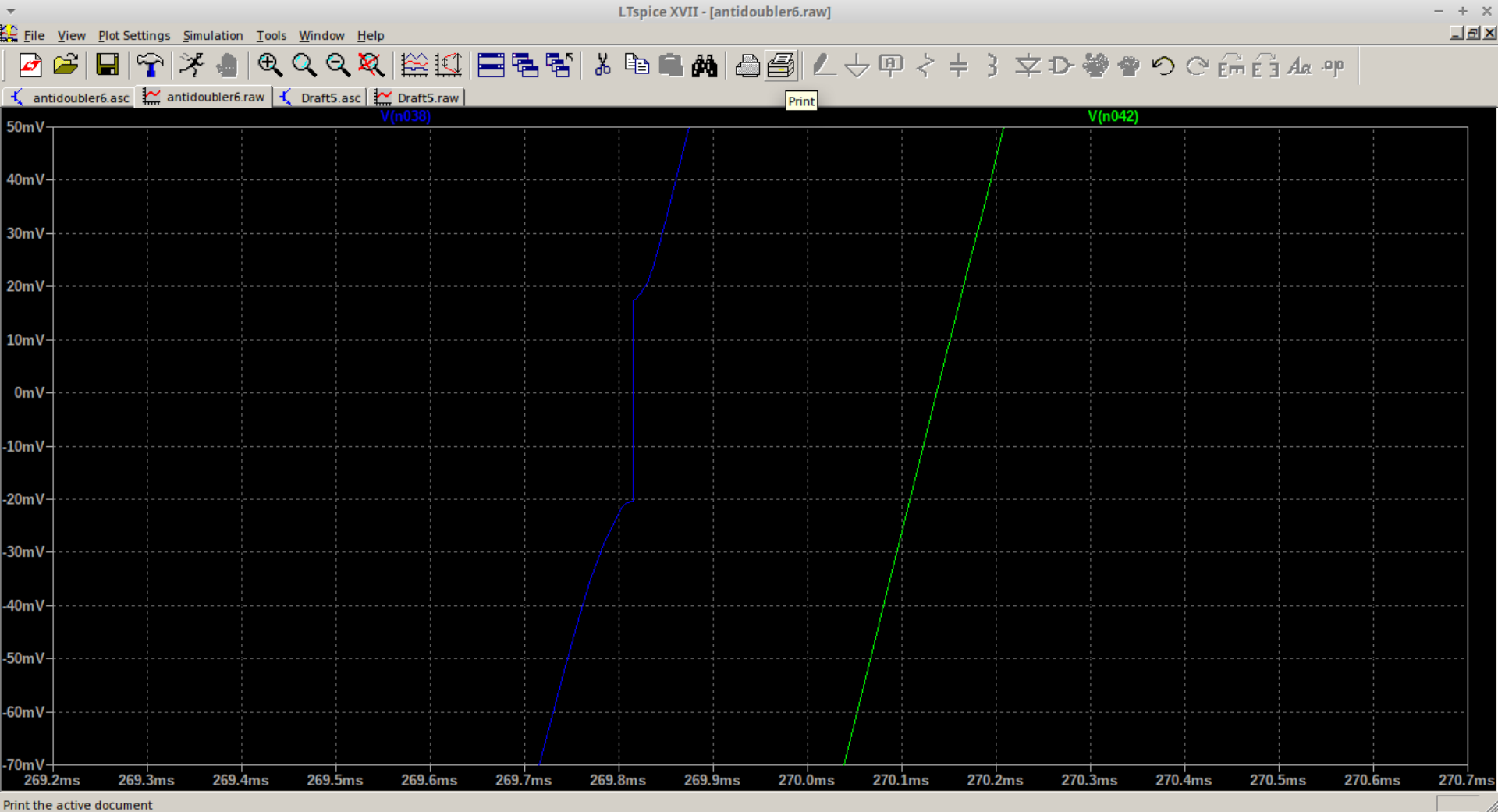


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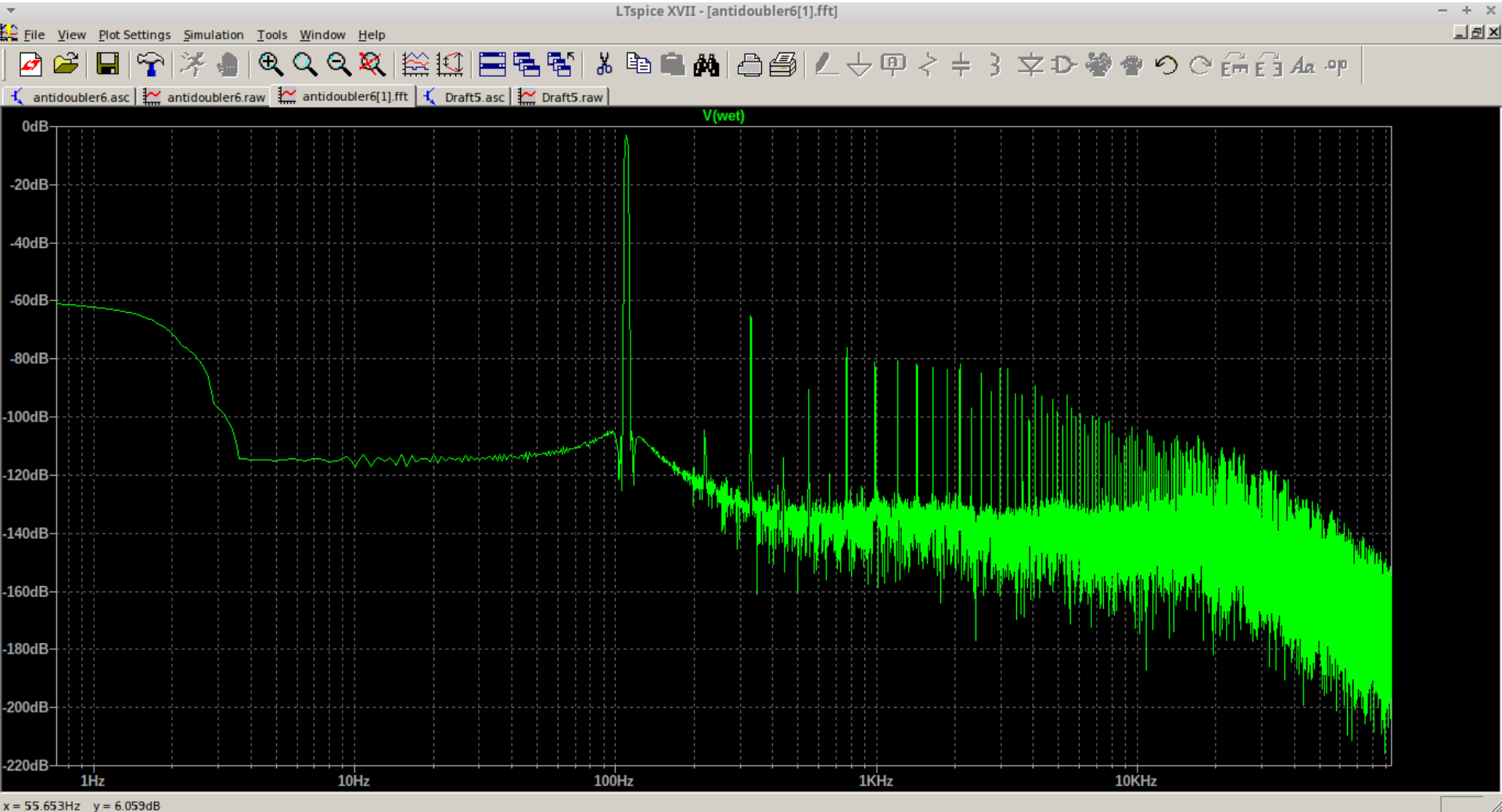


# Řízená inverze signálu - offset





# FFT výstupního signálu



# FFT výstupního signálu - příblížení

