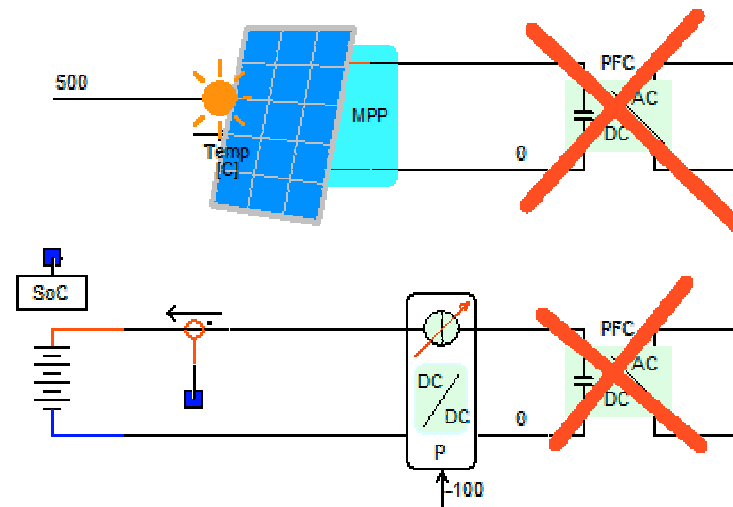


Combi-Cable in DC-netten

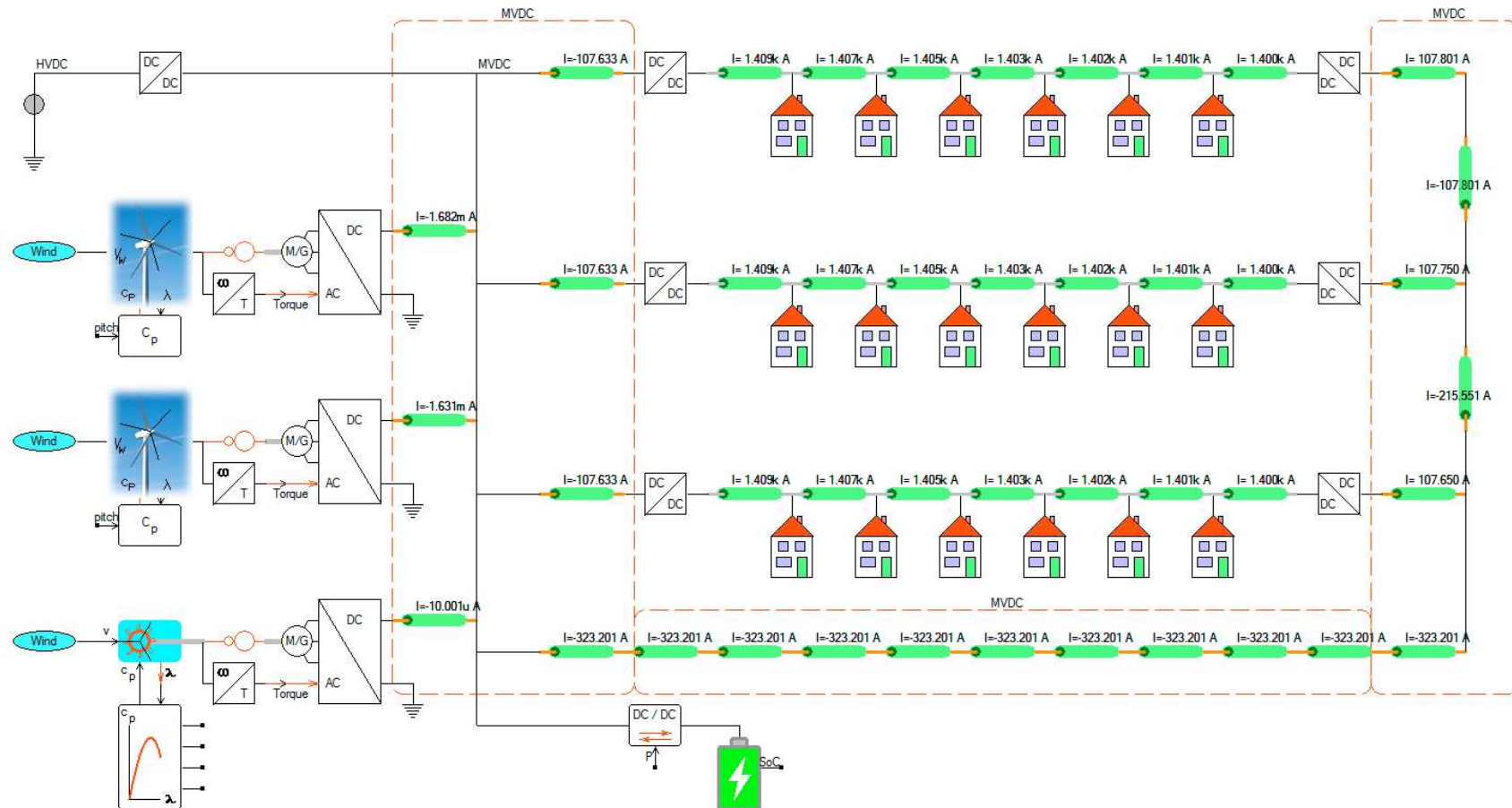
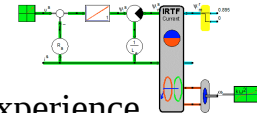
dr ir P.J.van Duijsen

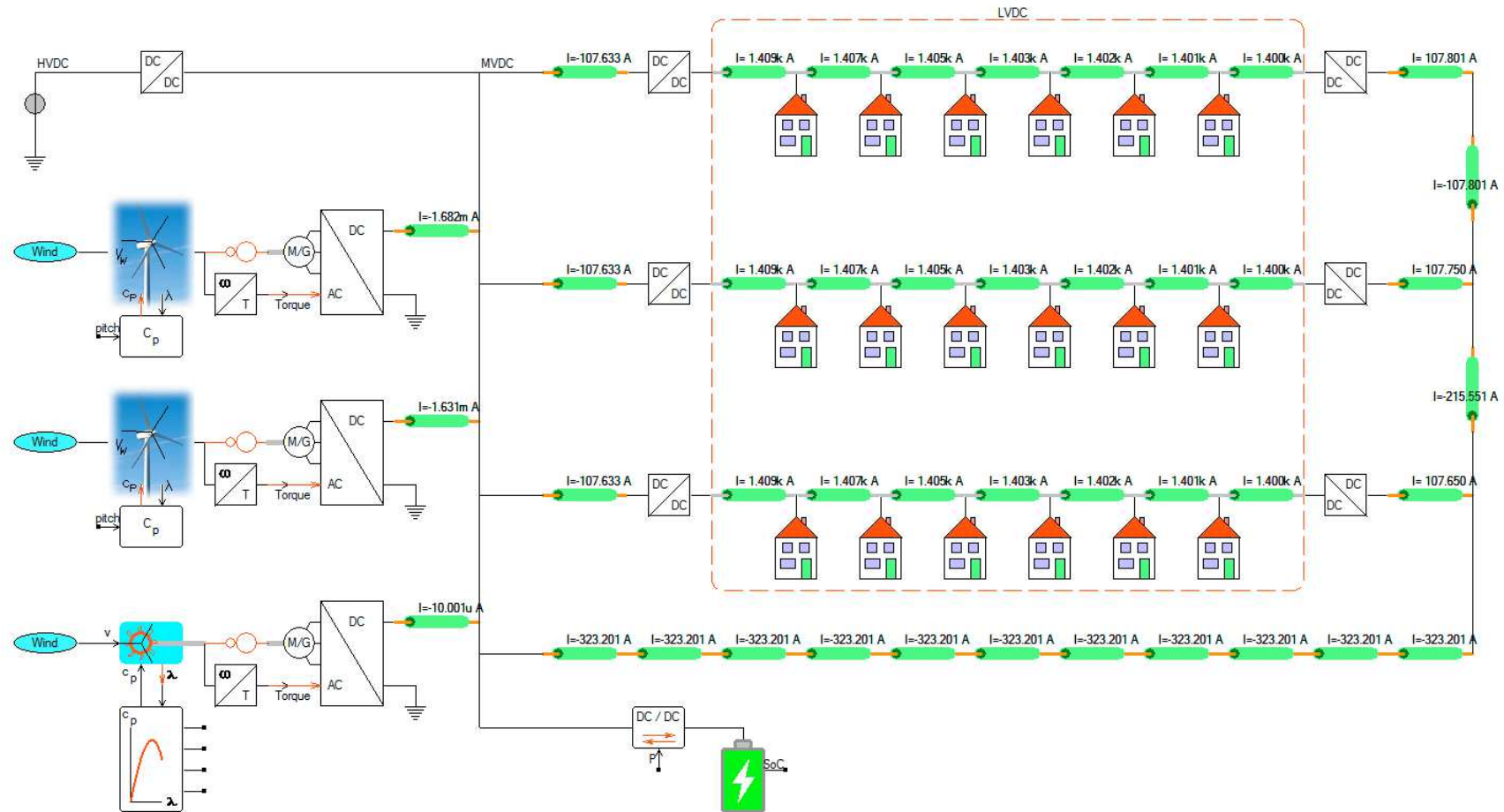
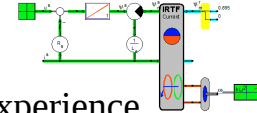
Learning by Simulation

Simulation Research
The Netherlands

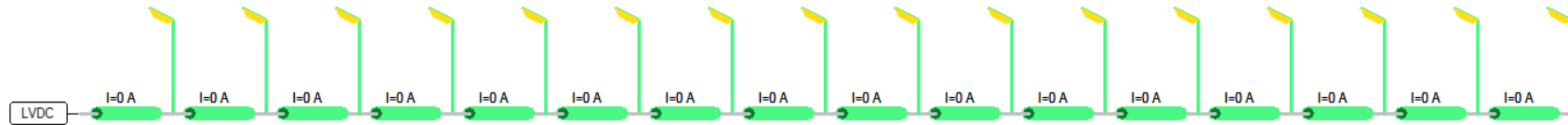


Welke Netten: MVDC

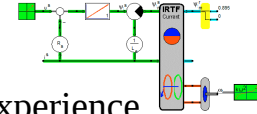




Welke Netten: Straatverlichting



Cable Design tool



Caspoc Simulation & Animation X Product detail - TKF [Tweentsch] X

cas poc.com/tools/powersystems/cable/sectorshaped/ Zoeken

Caspoc

Power Electronics Power Systems Help

Tools > Power Systems → Power Cables → Sector-shaped Core [Copy link](#)

Power Systems

POWER CABLES
Sector-shaped
Core

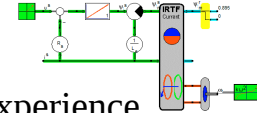
Cable geometry

Number of sectors	ns	4	[.]
Back radius	rb	16.4	[mm]
Insulation thickness (Leave 0 if ws and ds are specified)	t	1.8	[mm]
Sector depth	ds	12.7	[mm]
Sector width	ws	15.9	[mm]
Corner radius reducing depth	rcd	3	[mm]
Corner radius reducing width	rcw	3.5	[mm]
Sheath diameter	dsh	47.5	[mm]
Sheath wire diameter	dshw	1.15	[mm]
Number of sheath wires (Leave 0 to auto calc from sheath diameter)	nsh	48	[.]
Cable diameter	dc	52.7	[mm]
Inner sheath isolation thickness	tis	1.4	[mm]

Auxiliary conductors

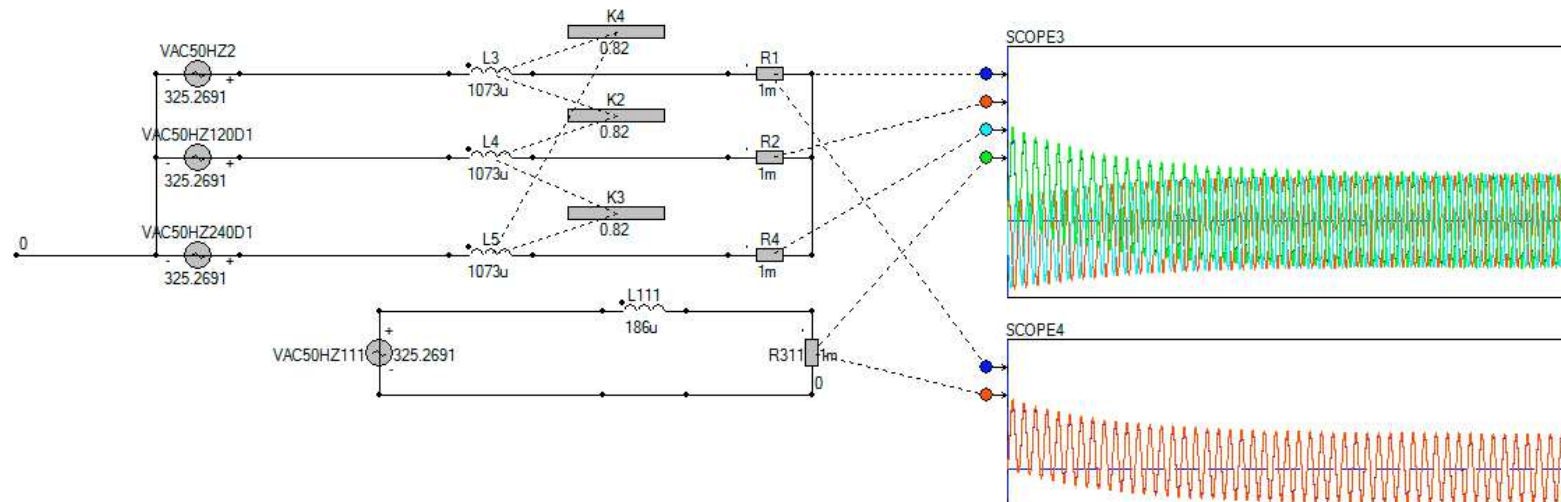
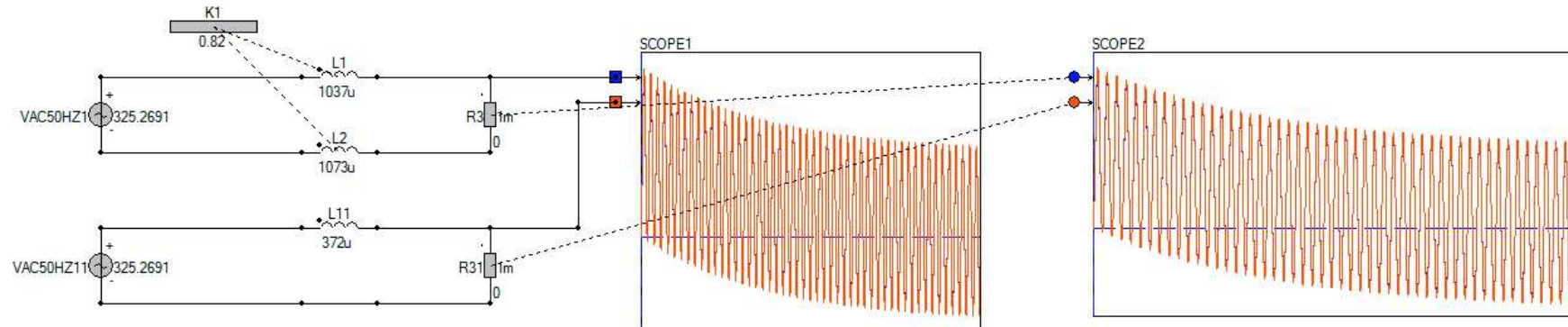
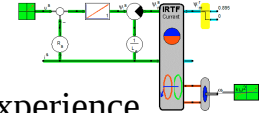
Cross section auxiliary conductor

Calculate LCR

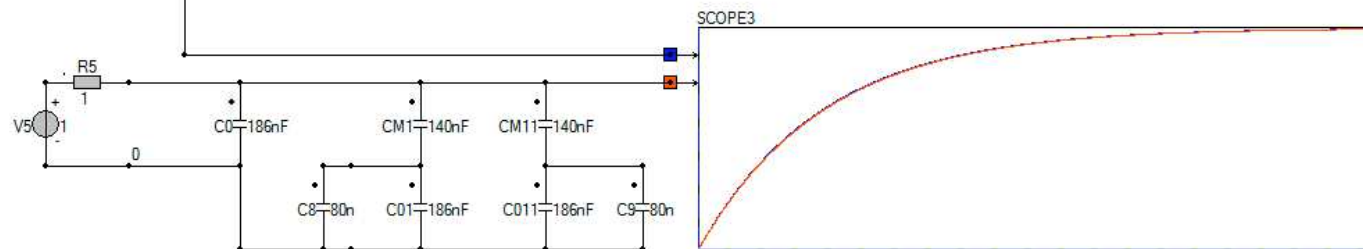
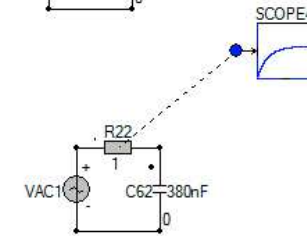
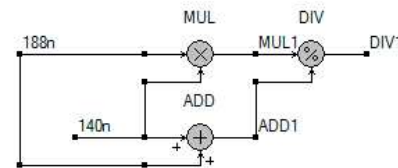
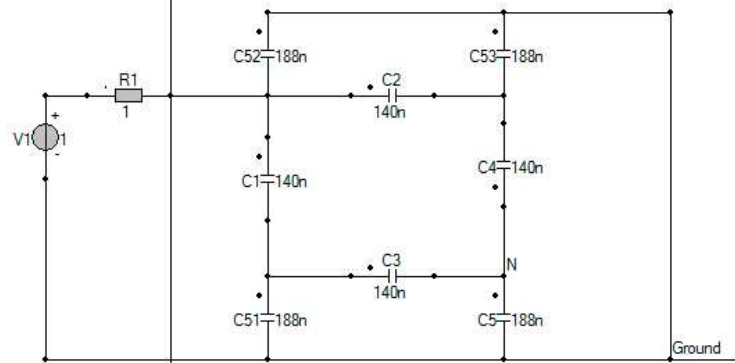
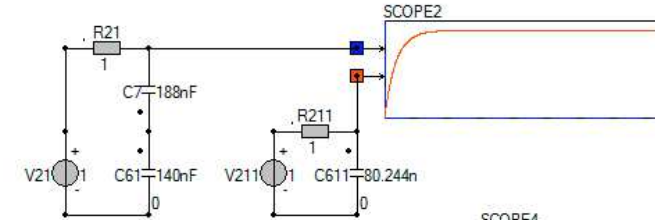
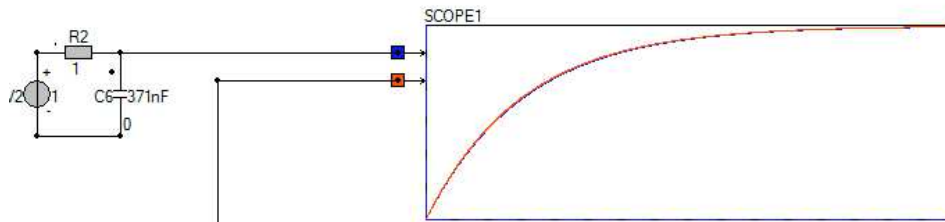
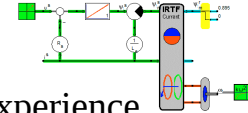


Nominal conductor diameter	d	13.4 [mm]
Nominal conductor cross section	nccs	140.935 [mm ²]
Geometric Mean Radius	GMR	5.6 [mm]
Geometric Mean Diameter	GMD	14.2 [mm]
Sector height	ds	12.6 [mm]
Sector width	ws	16.1 [mm]
Conductor Resistance		
Resistance copper wire	R _{CU}	126.5 [mΩ/km]
Resistance Aluminium wire	R _{AL}	200.2 [mΩ/km]
Conductor Inductance		
Self-Inductance	L _c	1037.6 [μH/km]
Mutual-Inductance	L _{mc}	851.3 [μH/km]
Mutual-Inductance diagonal	L _{m2c}	781.8 [μH/km]
Cable-Inductance(Given in datasheet)	L _{cable}	186.3 [μH/km]
Impedance	Z _c	58.516 [mΩm/km]
Conductor Capacitance		
Capacitance conductor-conductor	C _m	97.4 [nF/km]
Capacitance conductor-sheath	C ₀	150.2 [nF/km]
Effective Capacity to Neutral(Given in datasheet)	C _{tot}	283 [nF/km]
Sheath Resistance		
Resistance sheath	R _{sheath}	357.7 [mΩ/km]
Sheath Inductance		
Self-Inductance	L _{sh}	932.8 [μH/km]
Mutual-Inductance Conductor-Sheath	L _{msh}	748 [μH/km]
Auxiliary Conductor		
Resistance copper wire	R _{auxCU}	2972.5 [mΩ/km]
Self-Inductance auxiliary	L _{aux}	1366.8 [μH/km]
Mutual-Inductance auxiliary-core	L _{maux}	887.5 [μH/km]
Mutual-Inductance aux-aux	M _{aux}	138.6 [μH/km]
Aux-core Capacitance	C _{aux-core}	66.118 [nF/km]
Aux-sheath Capacitance	C _{aux-sheath}	78.518 [nF/km]
Coupling factors		
Coupling Core-Core	k _{cc}	0.82
Coupling Core-Core diagonal	k _{ccd}	0.754

Inductance

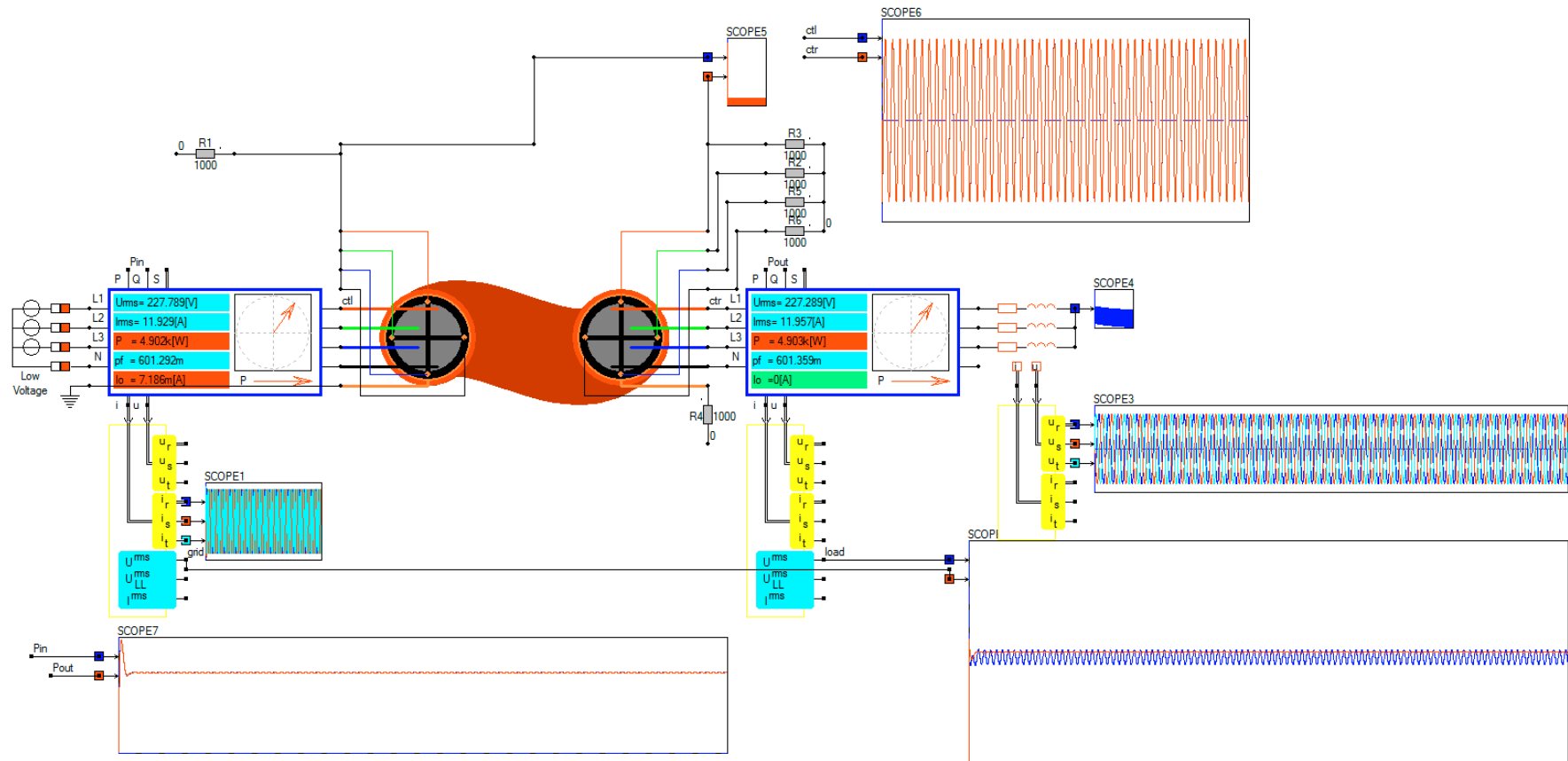
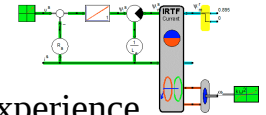


Capacitance

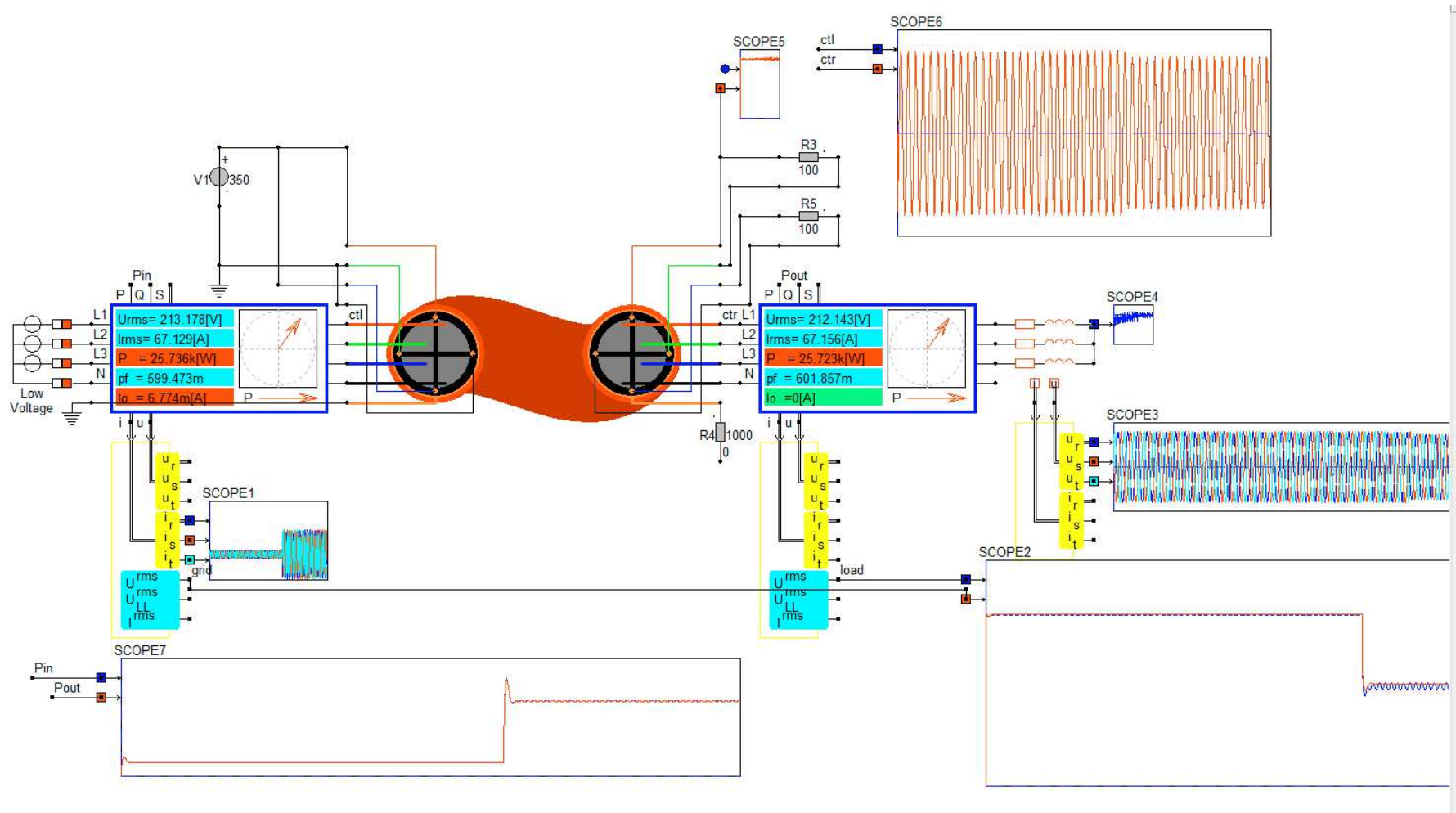
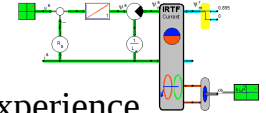


NOTE1

C0 core naar sheath
Cm//Cx core naar naastgelegen core naar sheath
waarbij Cx = C0 + Cm//C0 capaciteit van de daarnaast gelegen core naar sheath

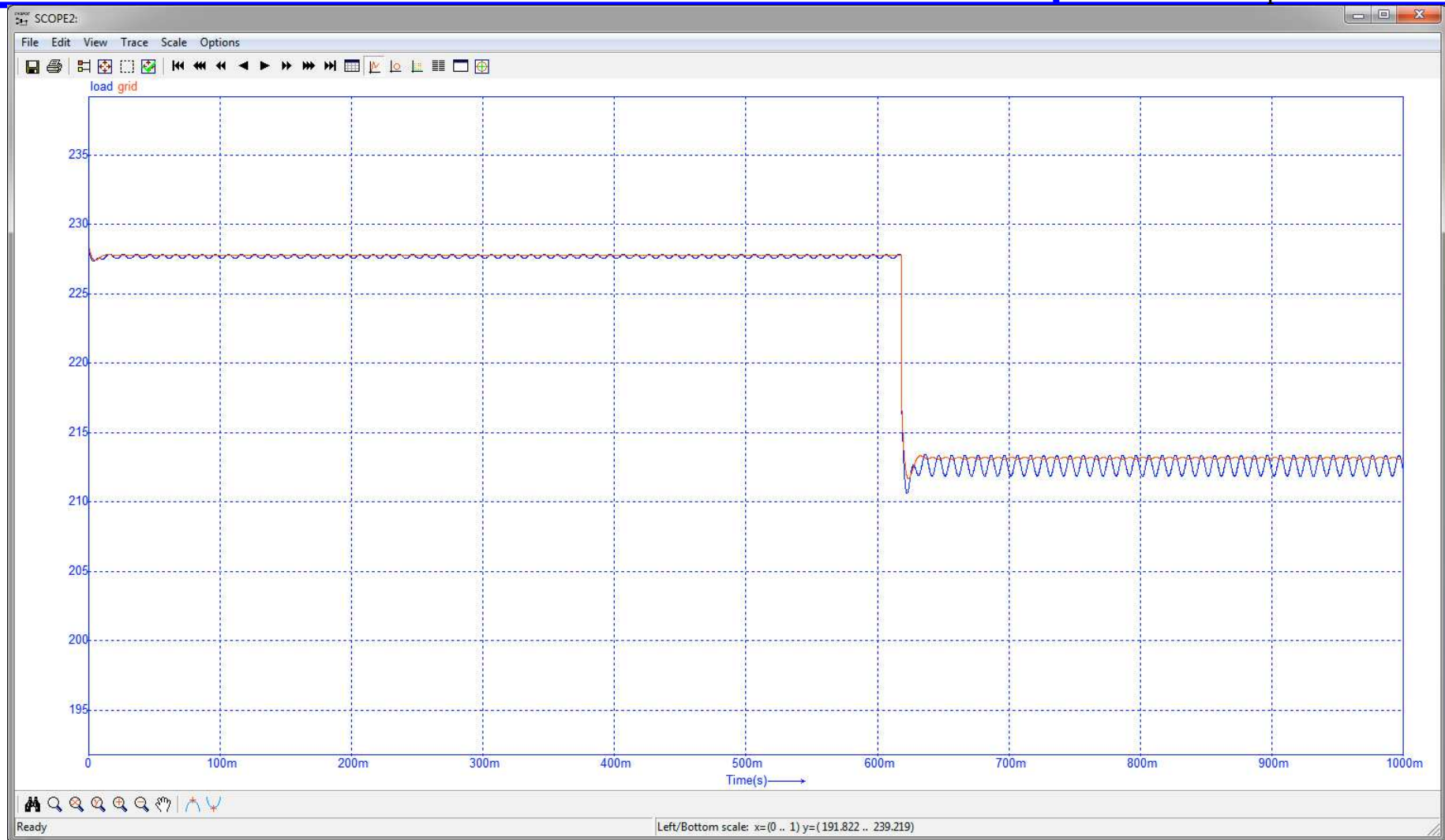
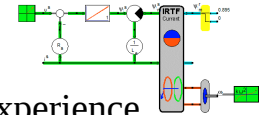


Change load from 5kw to 30kw



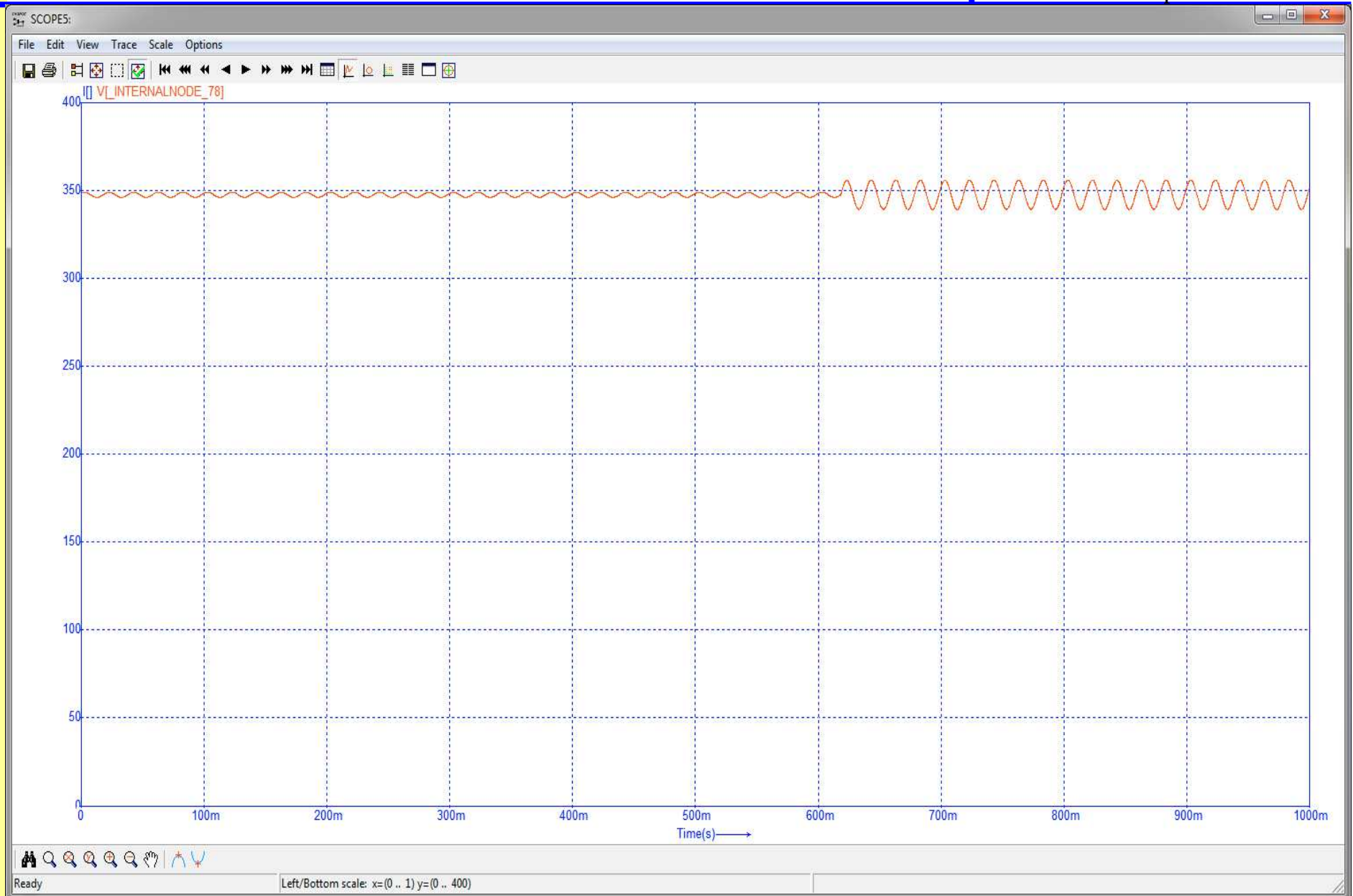
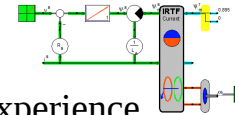
- More ripple on virtual neutral
- Higher ripple voltage on the auxilairy cores

Ripple on RMS input/output voltage

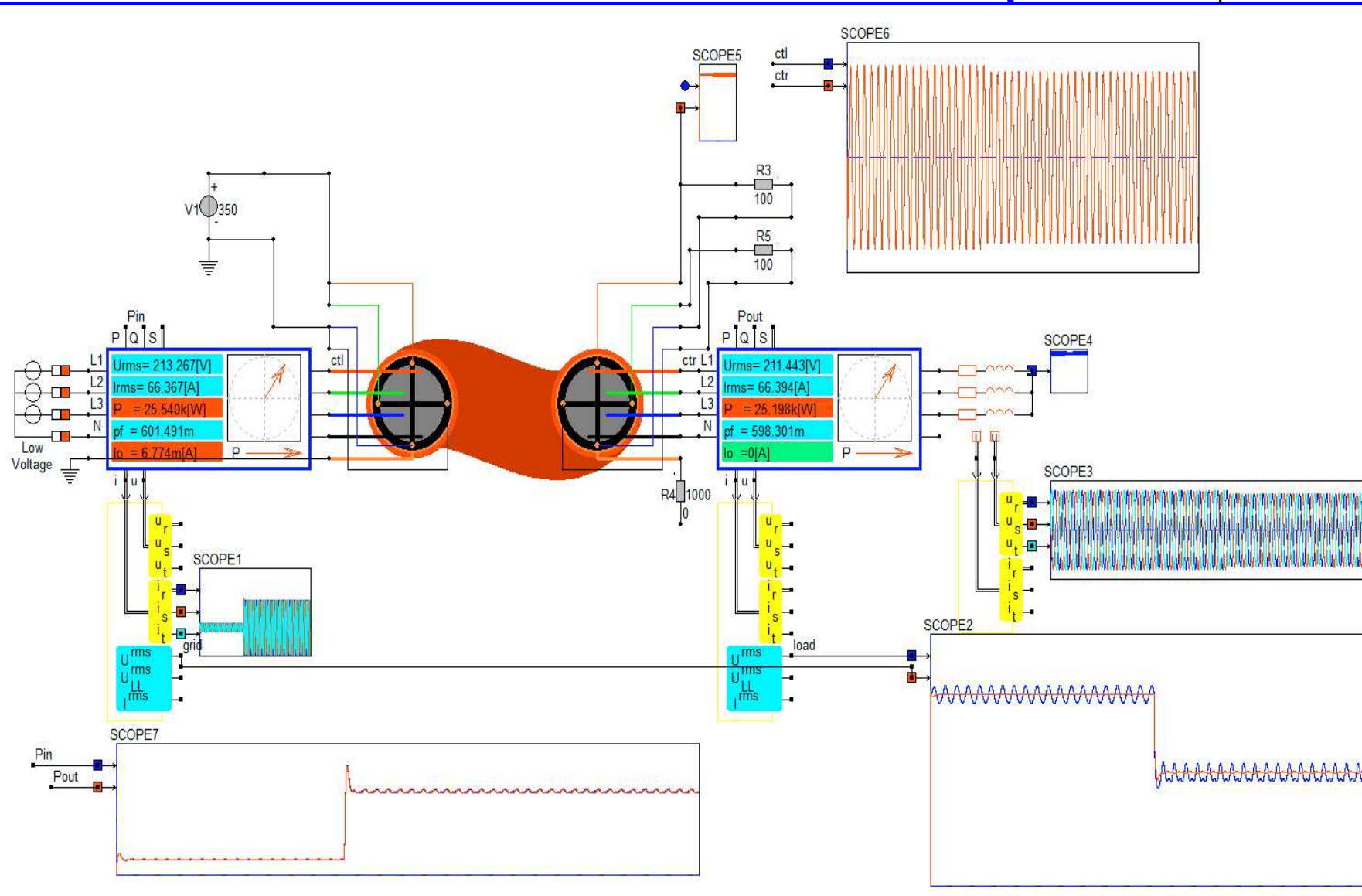
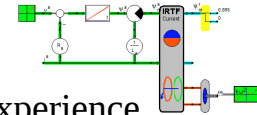


- RMS input/output voltage

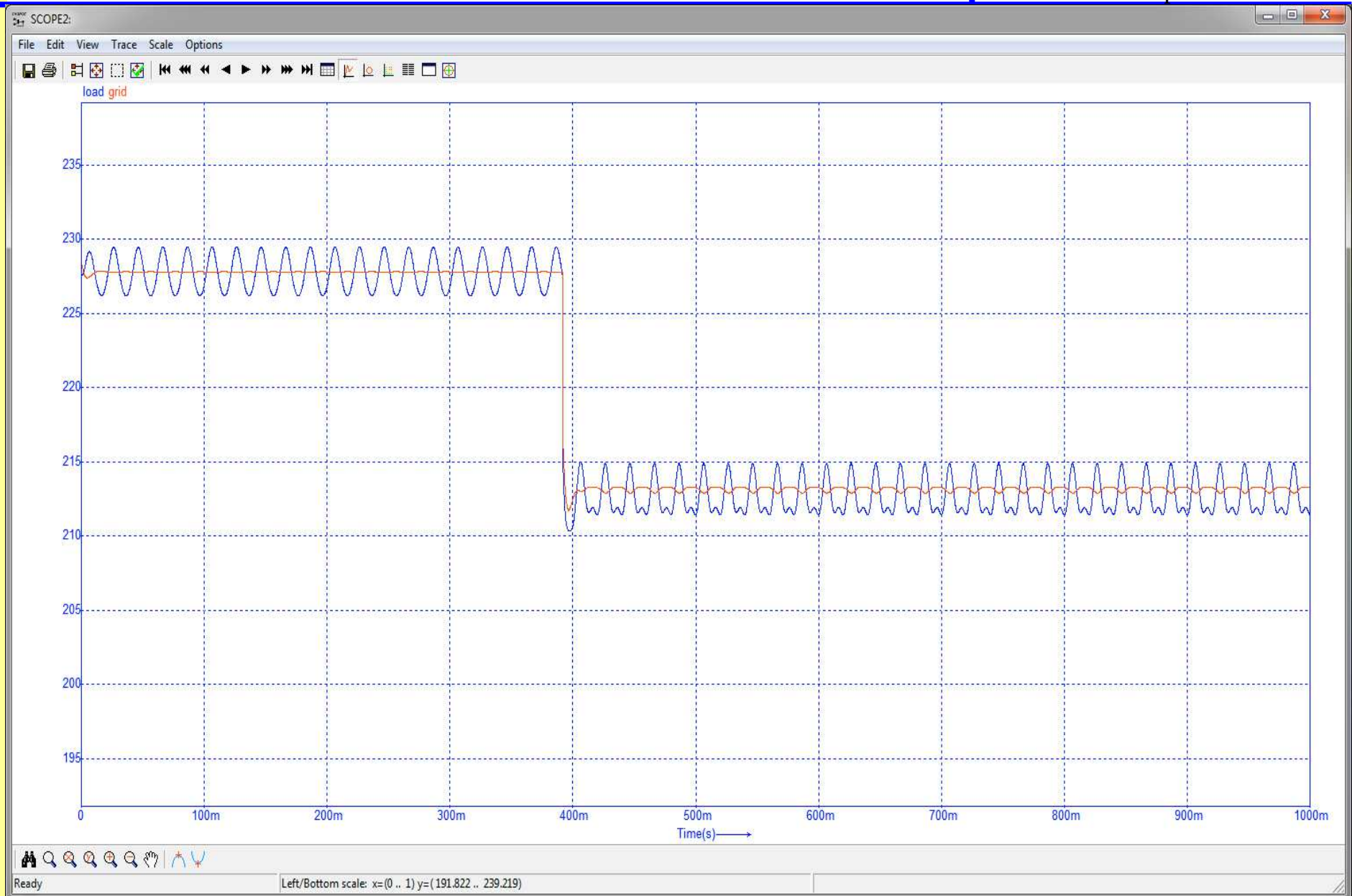
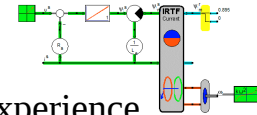
Ripple on Auxilairy core



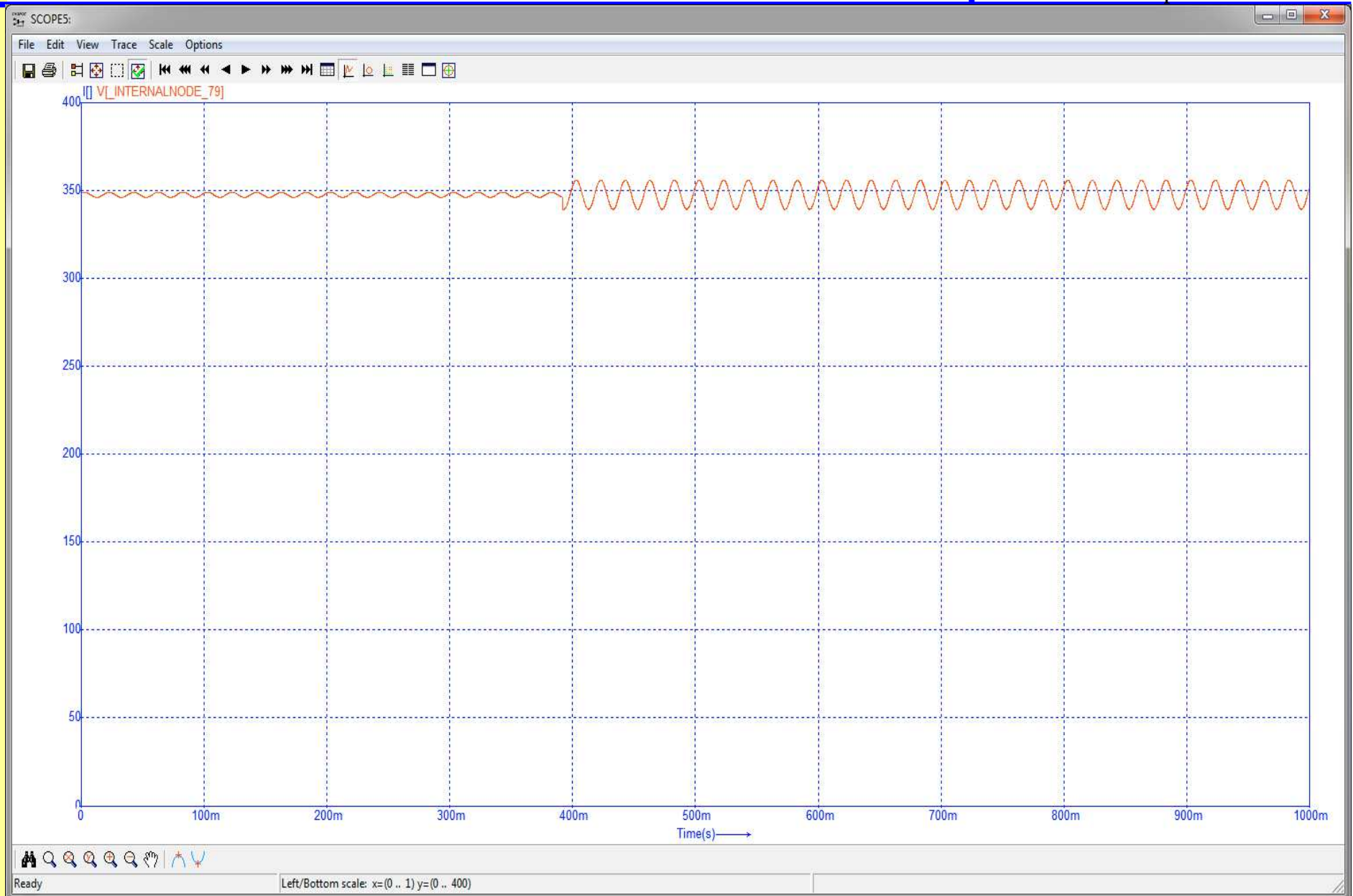
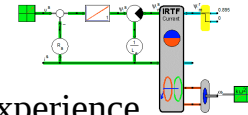
Change auxilairy core connection



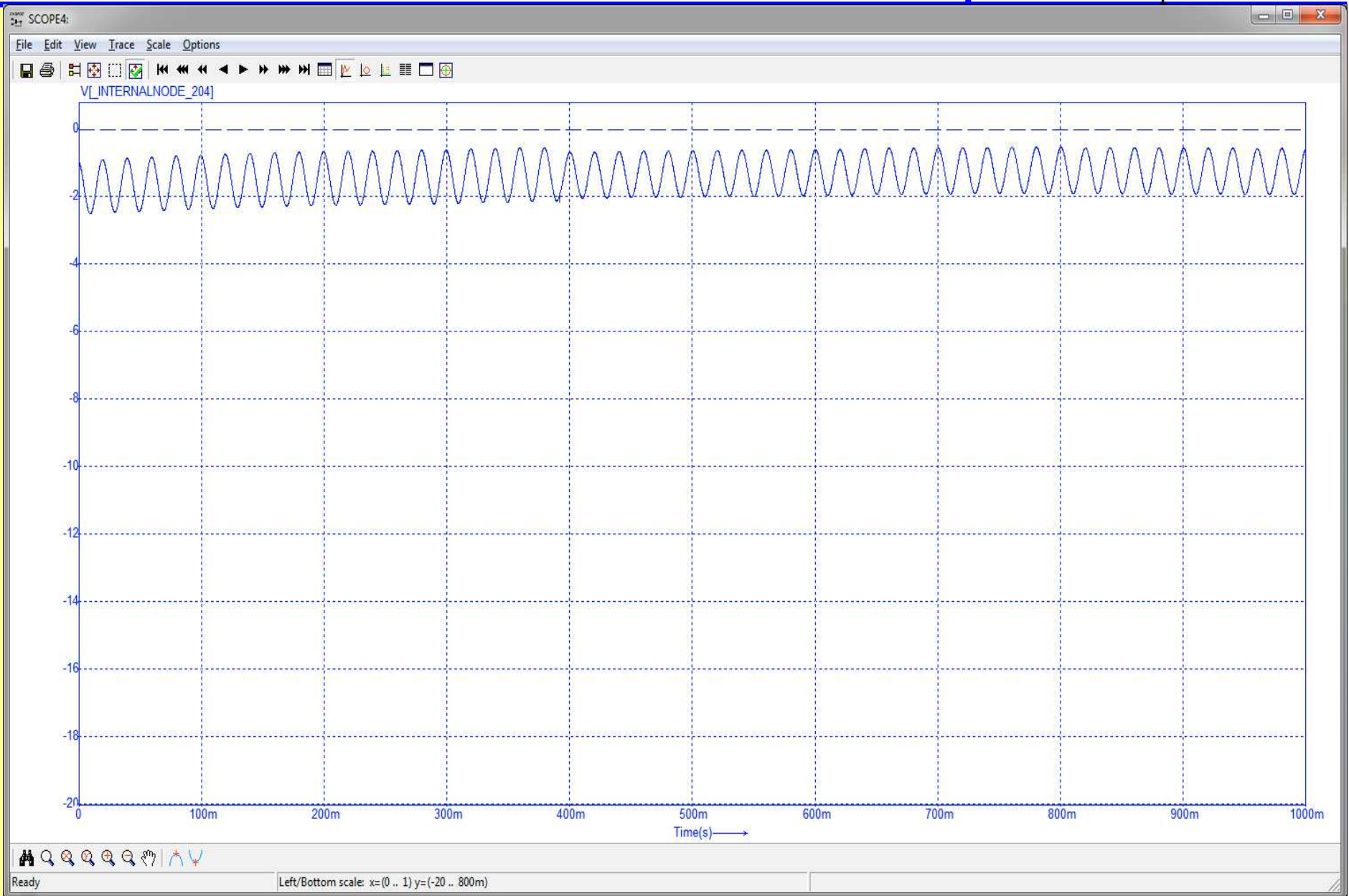
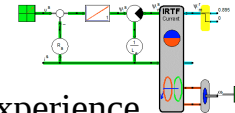
RMS input/output voltage

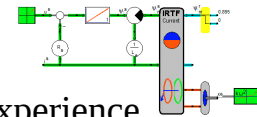


Voltage Auxilairy core



Voltage virtual neutral load





■ Vragen?

