

## Wireless Power Transfer

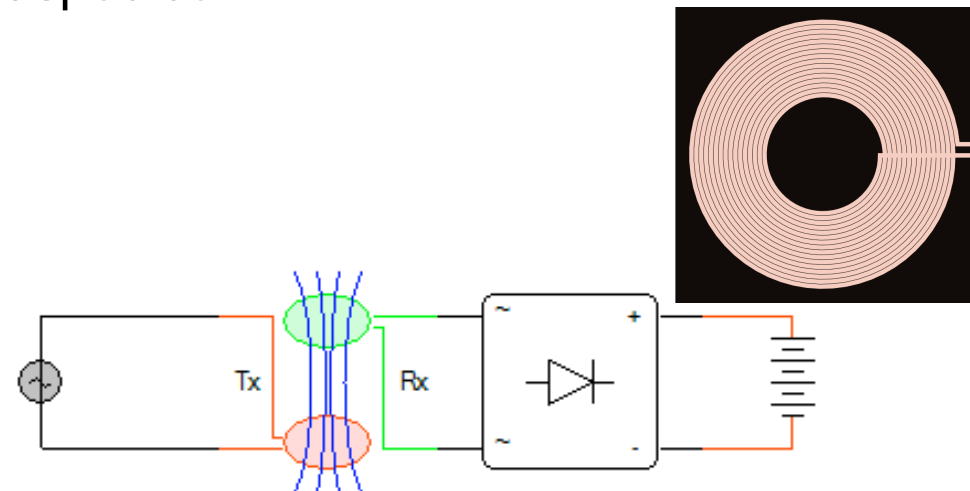
dr ir P.J.van Duijsen

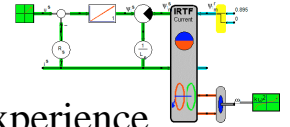
P.J.vanDuijsen@tudelft.nl

info@caspoc.com

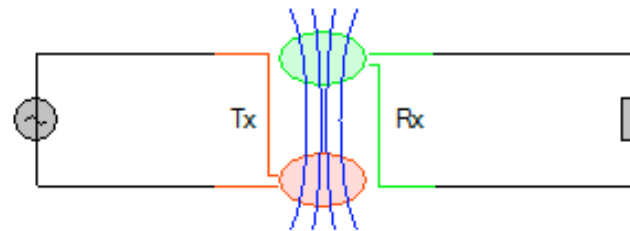
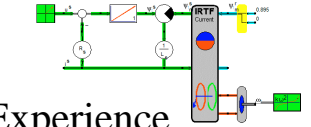
Learning by Simulation

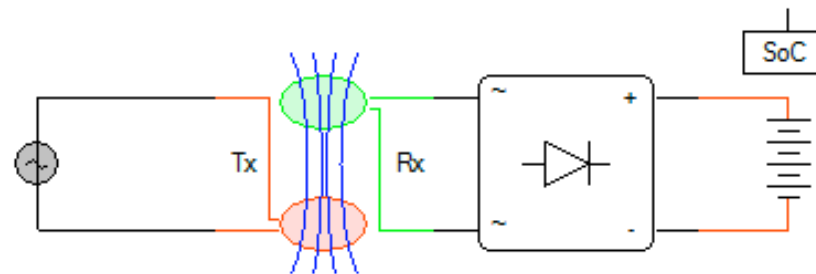
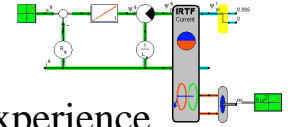
TU DELFT DCE&S  
Simulation Research  
The Netherlands





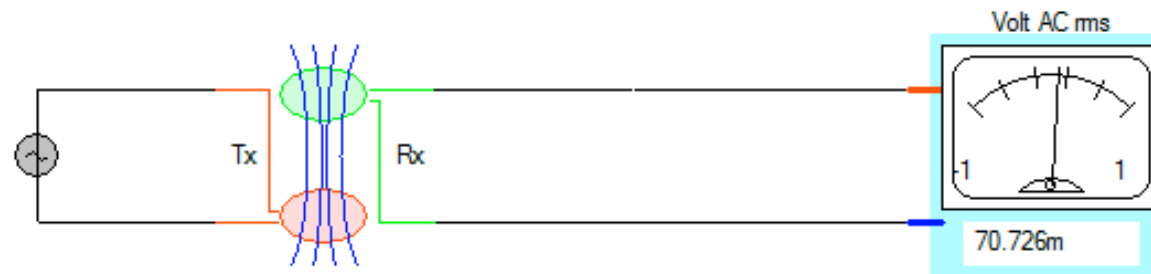
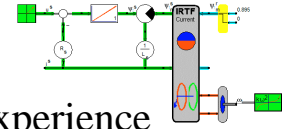
- Verschillende topologien:SS, PP, SP, PS
- Berekening spanning, stroom en vermogen in de overdracht
- Transmitter en Receiver coils
- Berekening koppelingsfactor
- Berekening efficiency





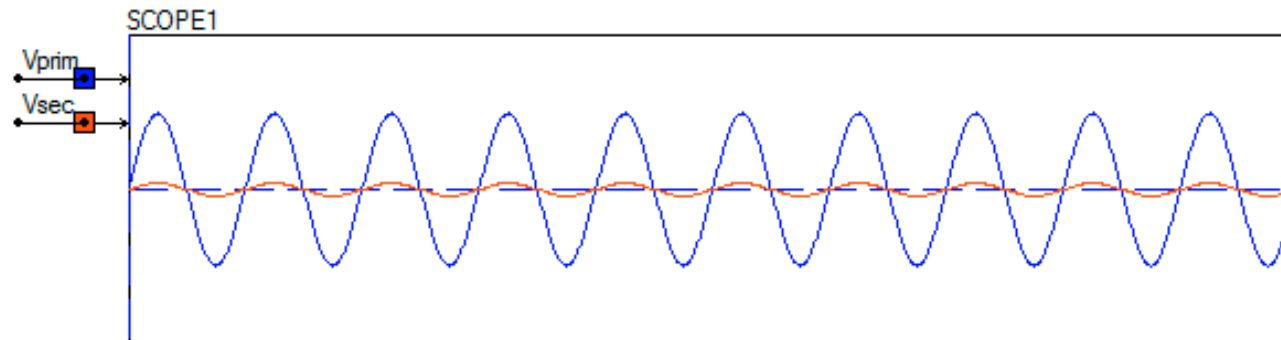
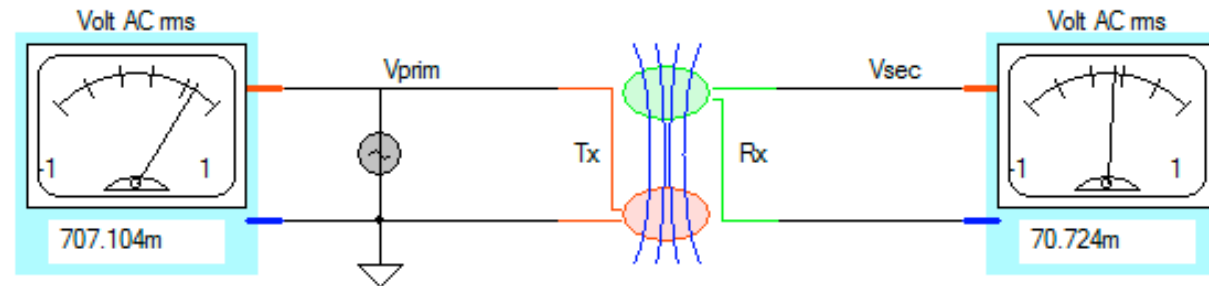
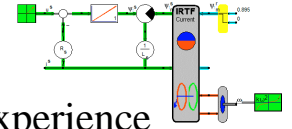
# Voltage transfer depending on k

A simulation Experience



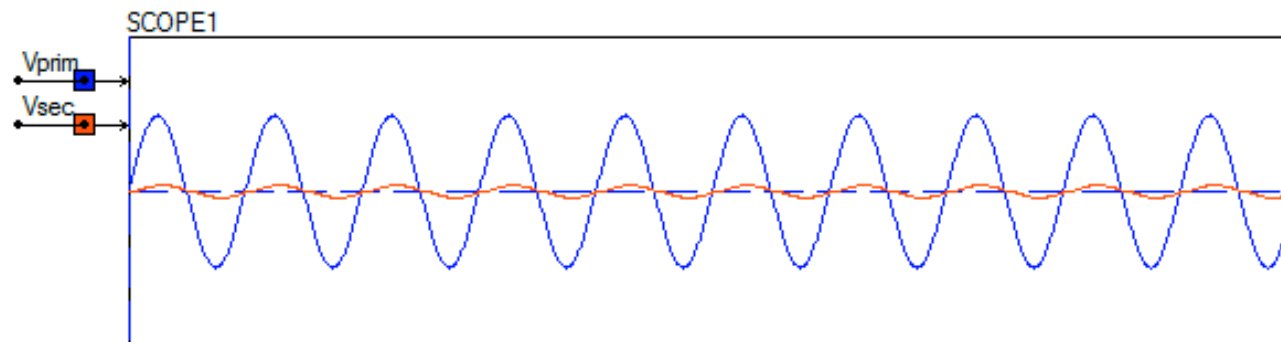
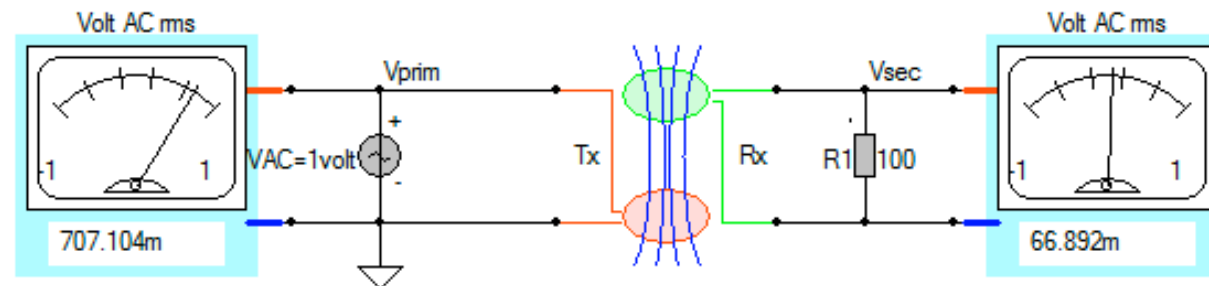
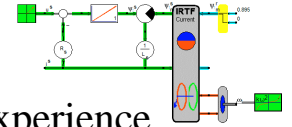
# Small k gives nearly no secondary voltage

A simulation Experience



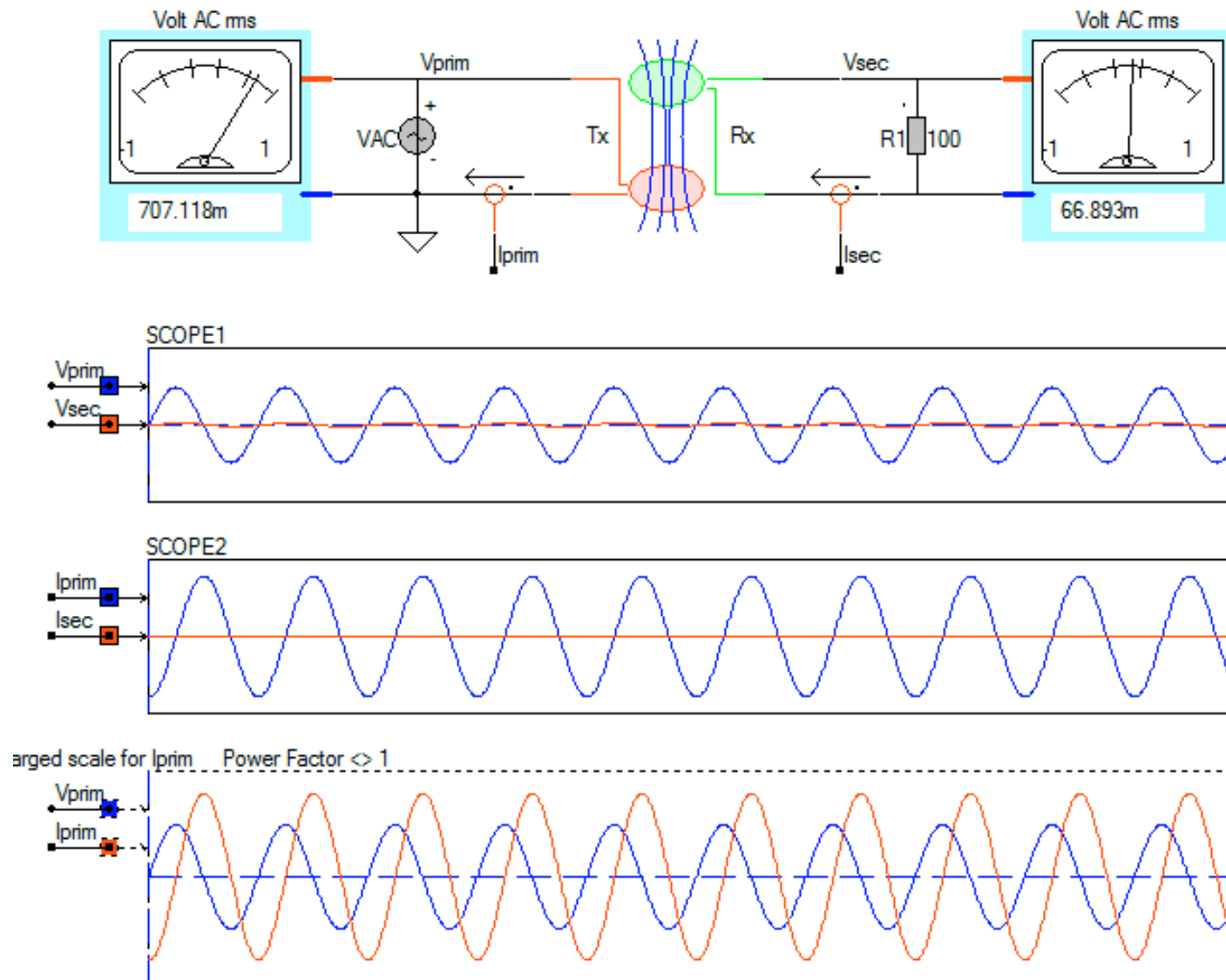
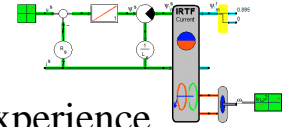
# Secondary load

A simulation Experience



# Input power factor $\neq 1$ , no power transfer

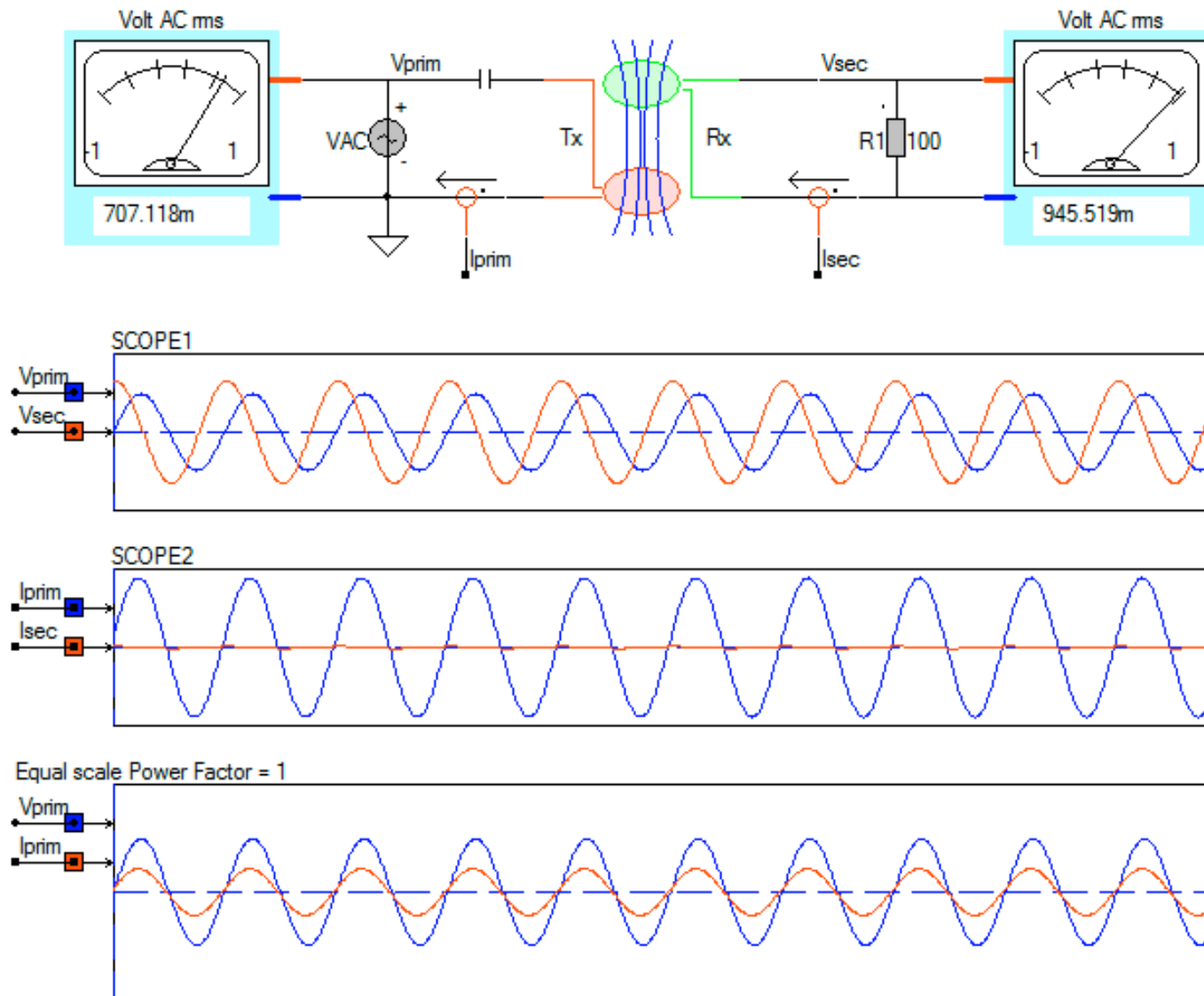
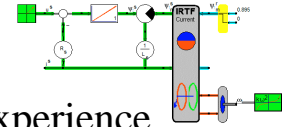
A simulation Experience





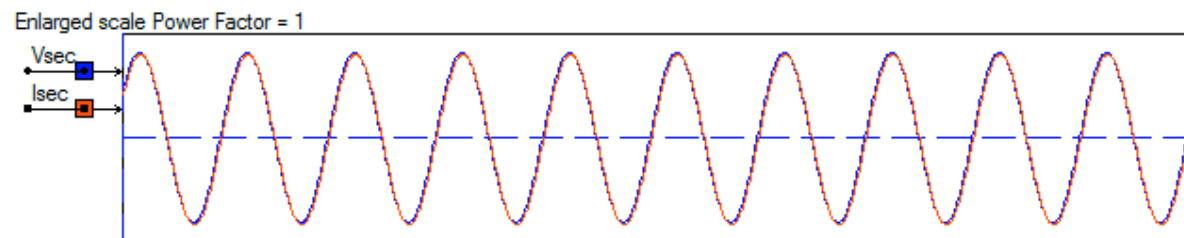
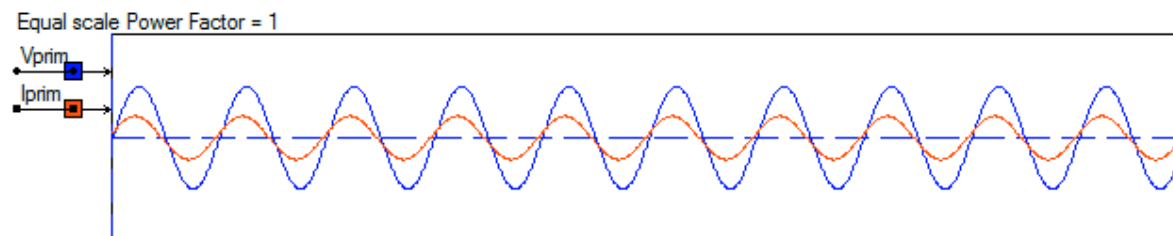
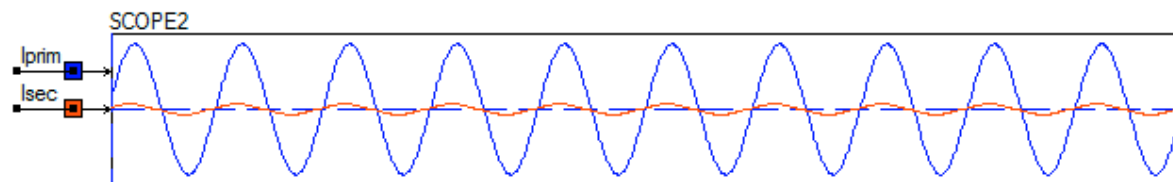
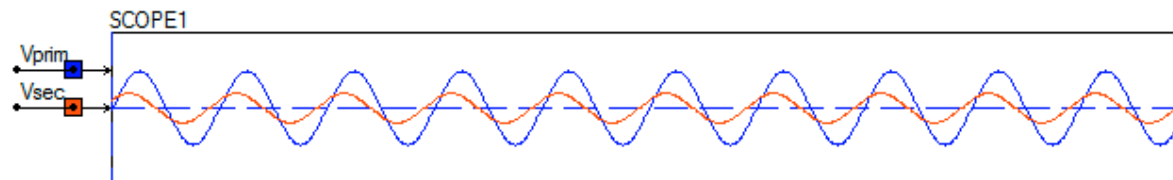
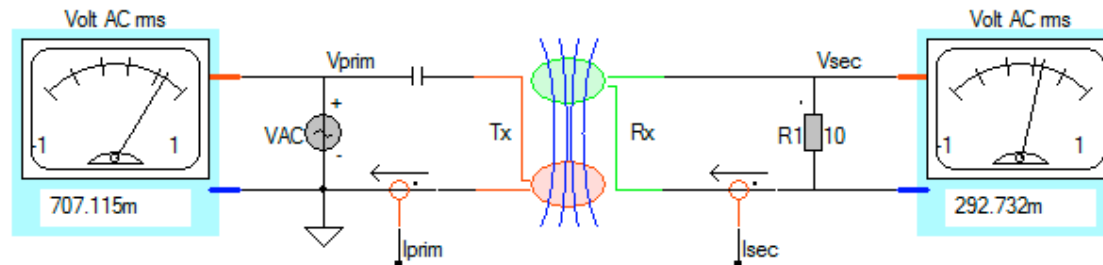
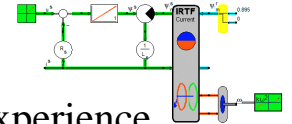
# Input power factor=1, power transfer

A simulation Experience



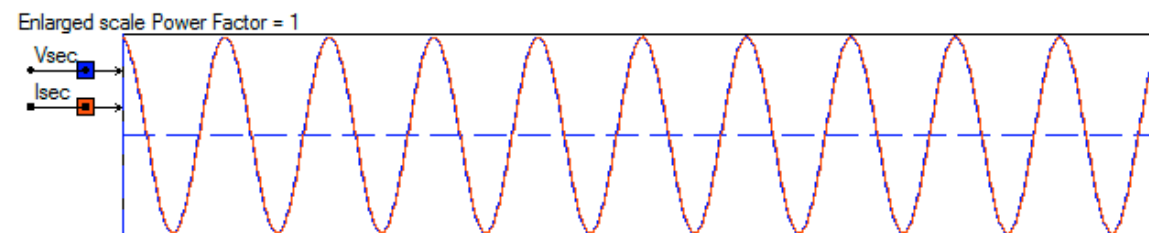
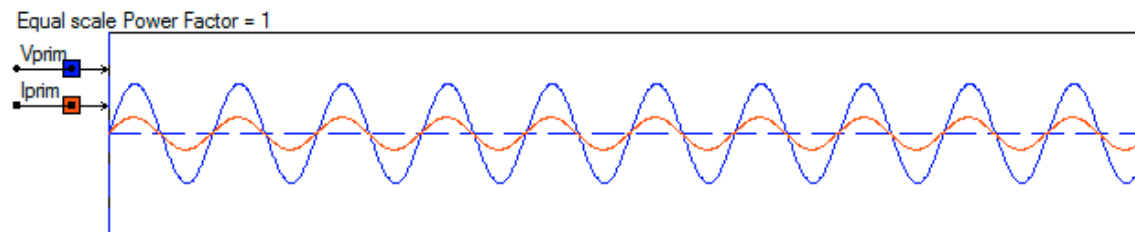
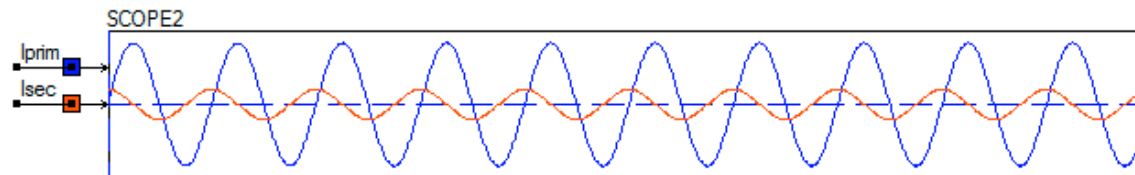
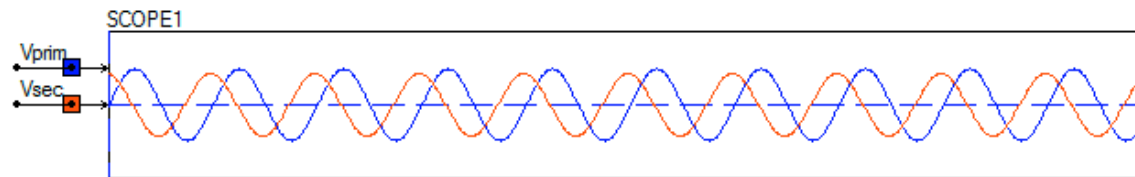
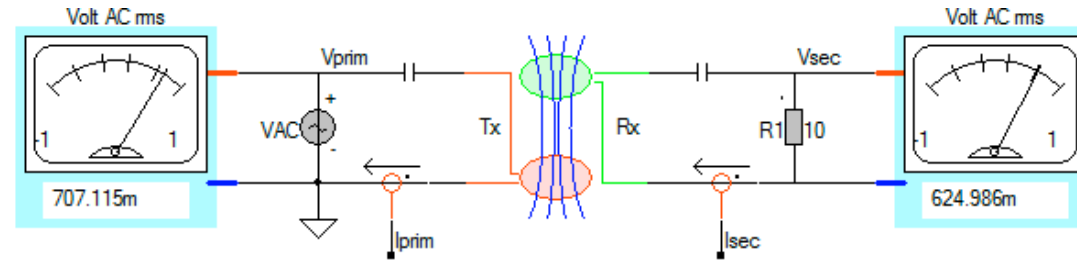
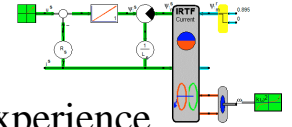
# Power factor secondary = 1 Load=R

A simulation Experience



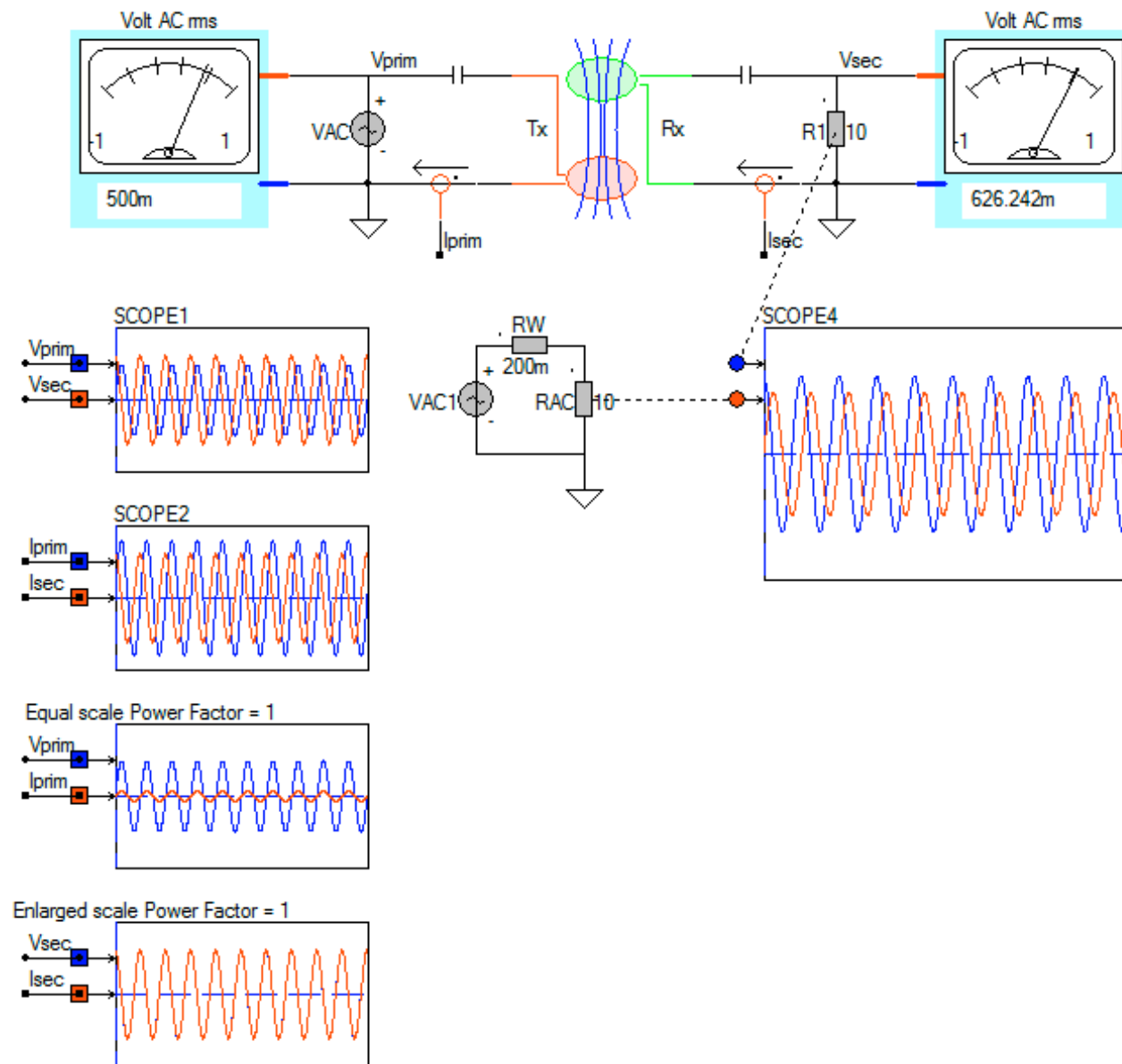
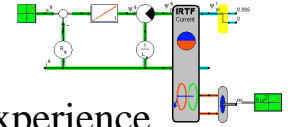
# Compensation on secondary side

A simulation Experience



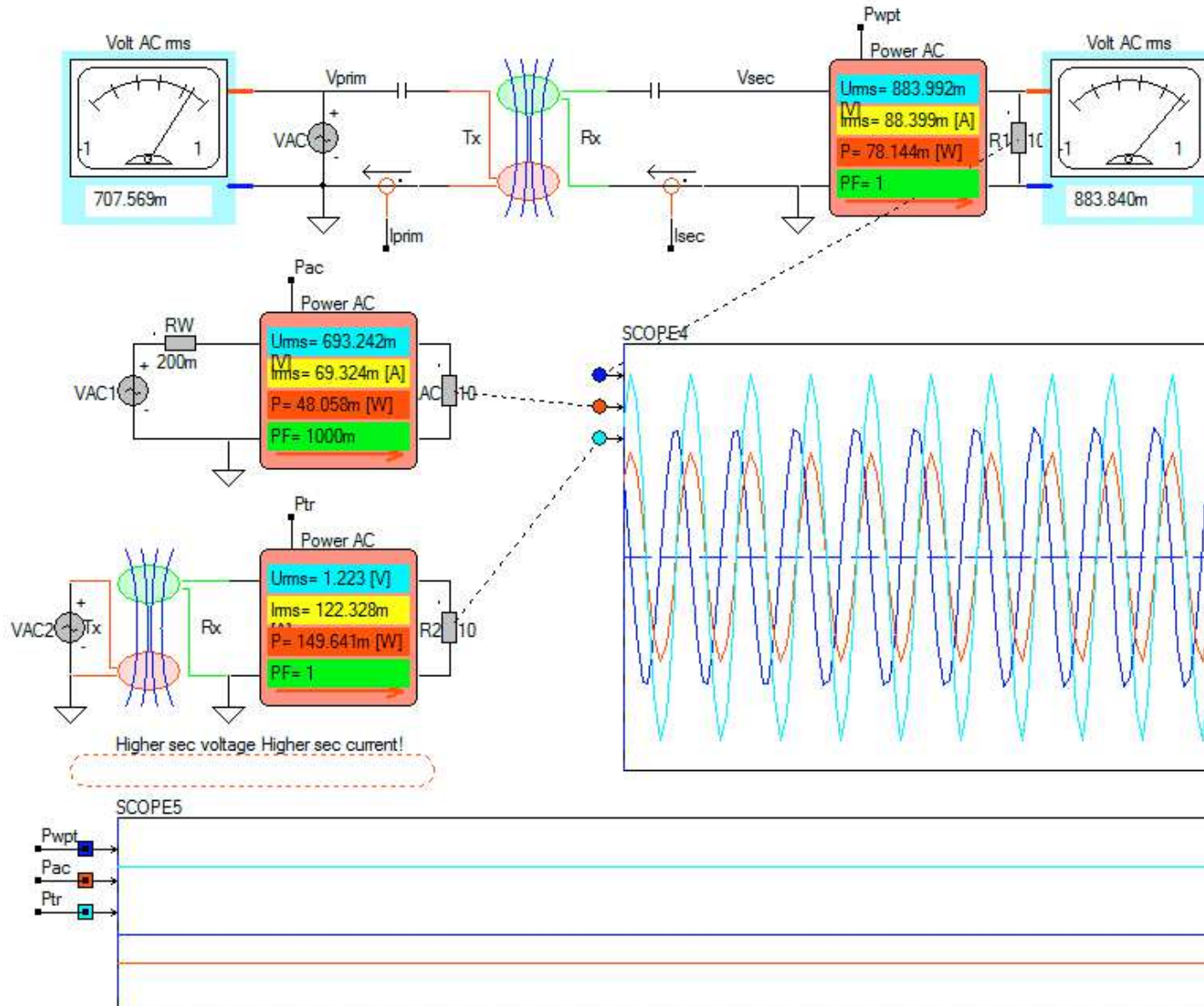
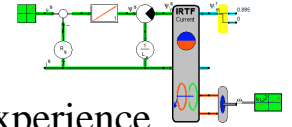
# Output current even higher????

A simulation Experience



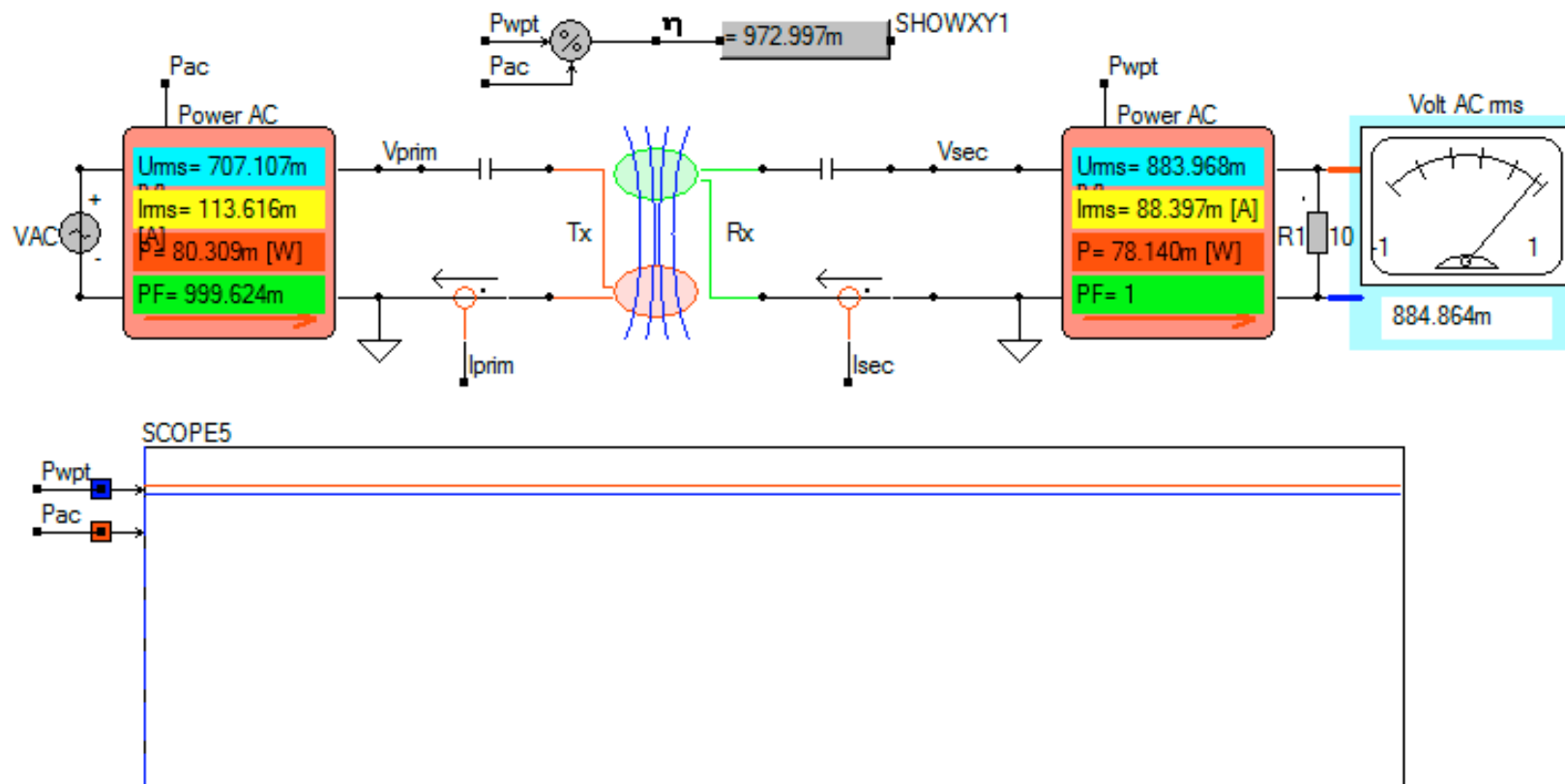
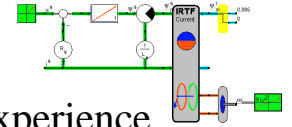
# Do not forget about ratio $L_{prim} : L_{sec}$

A simulation Experience



# Efficiency $k=0.25$

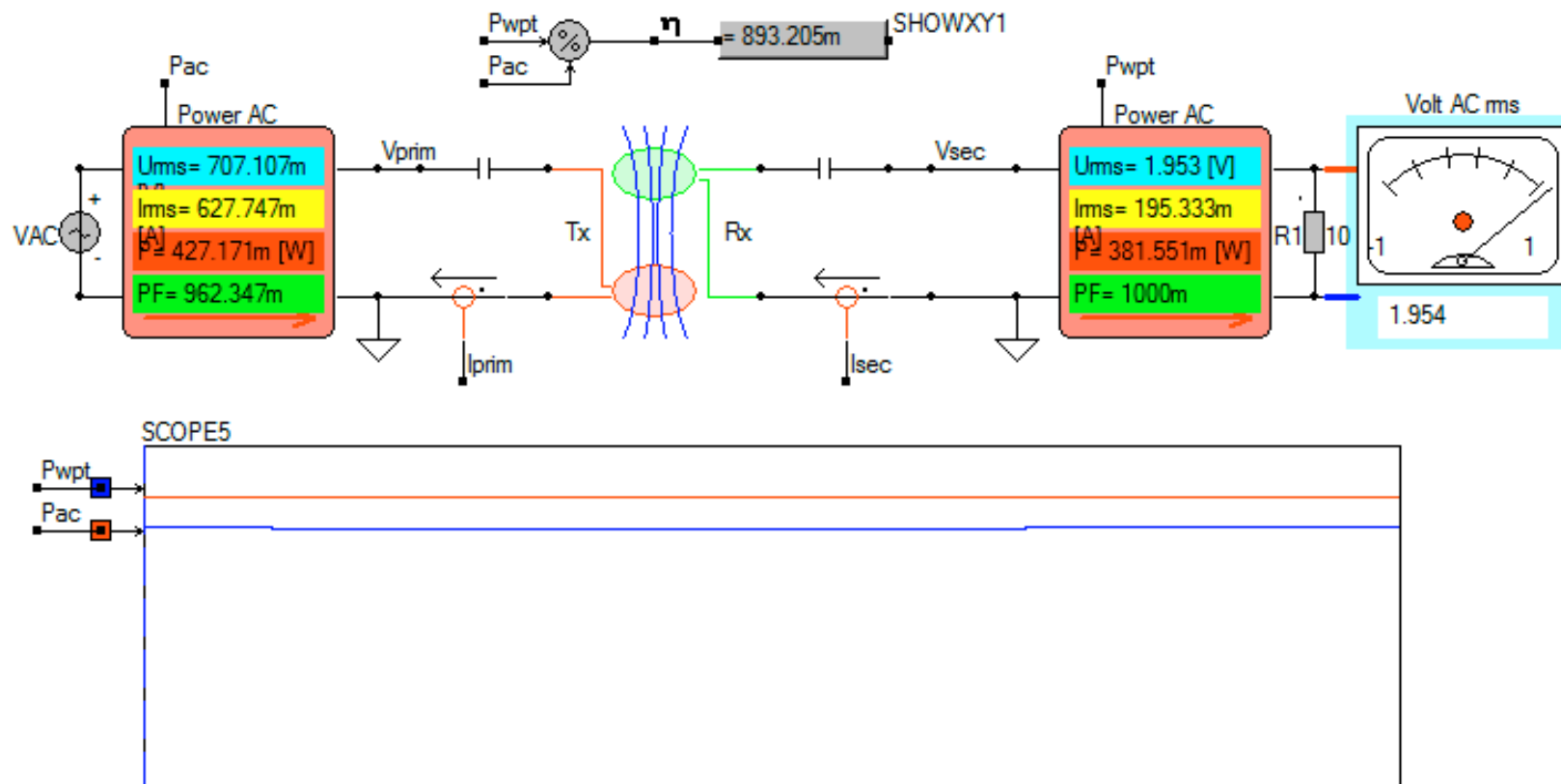
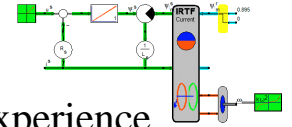
A simulation Experience





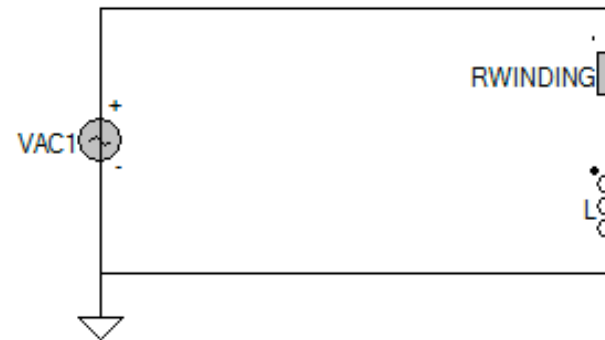
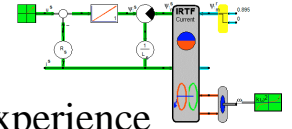
# Efficiency $k=0.1$

A simulation Experience



# Where are the losses?

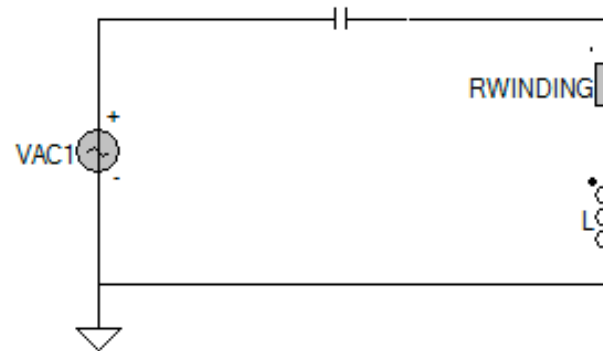
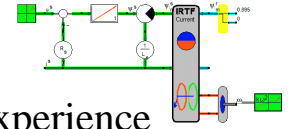
A simulation Experience





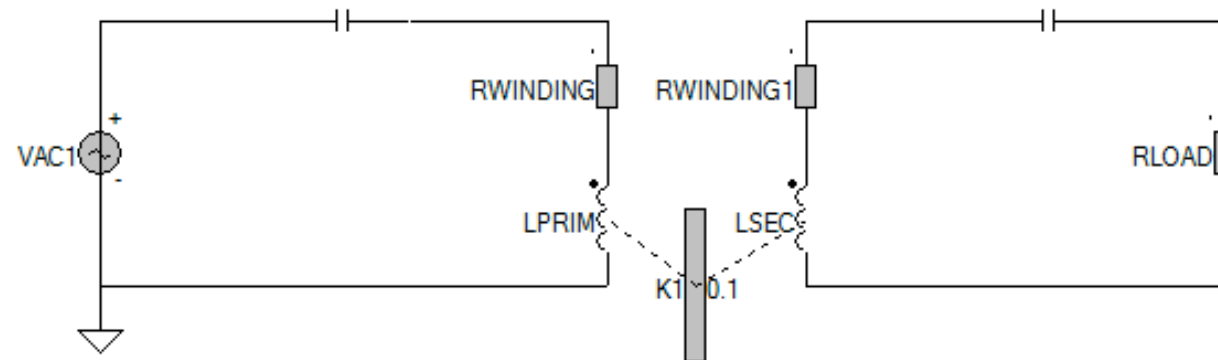
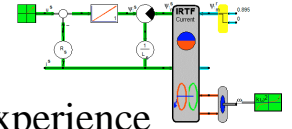
# Still only winding resistance losses

A simulation Experience



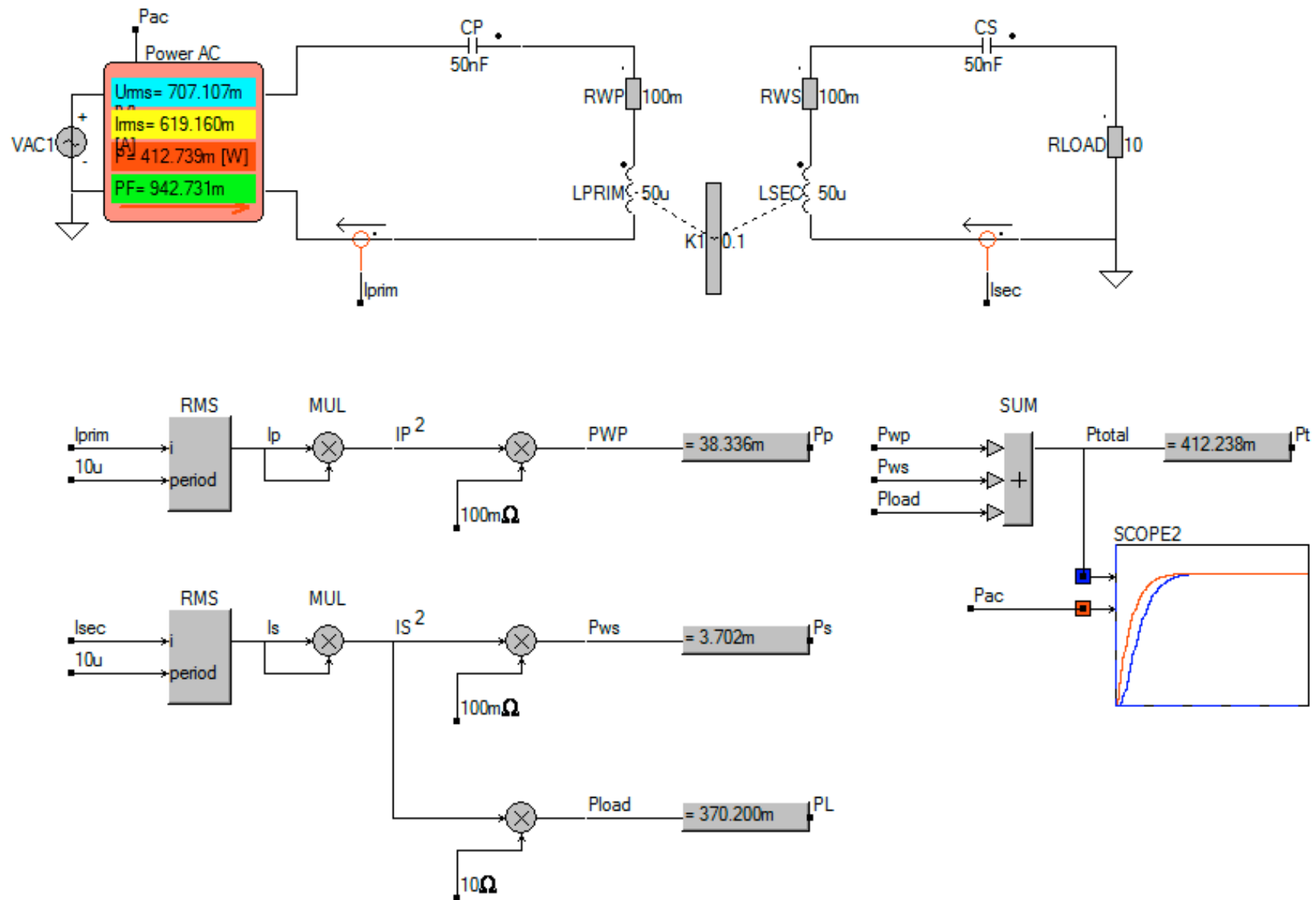
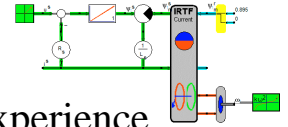
# Again only winding resistance losses

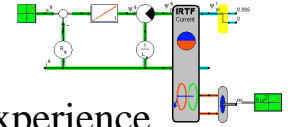
A simulation Experience



# Apart from Ferrite losses, only winding loss

A simulation Experience





- Kan het?
- Efficiency?
- Vragen?

