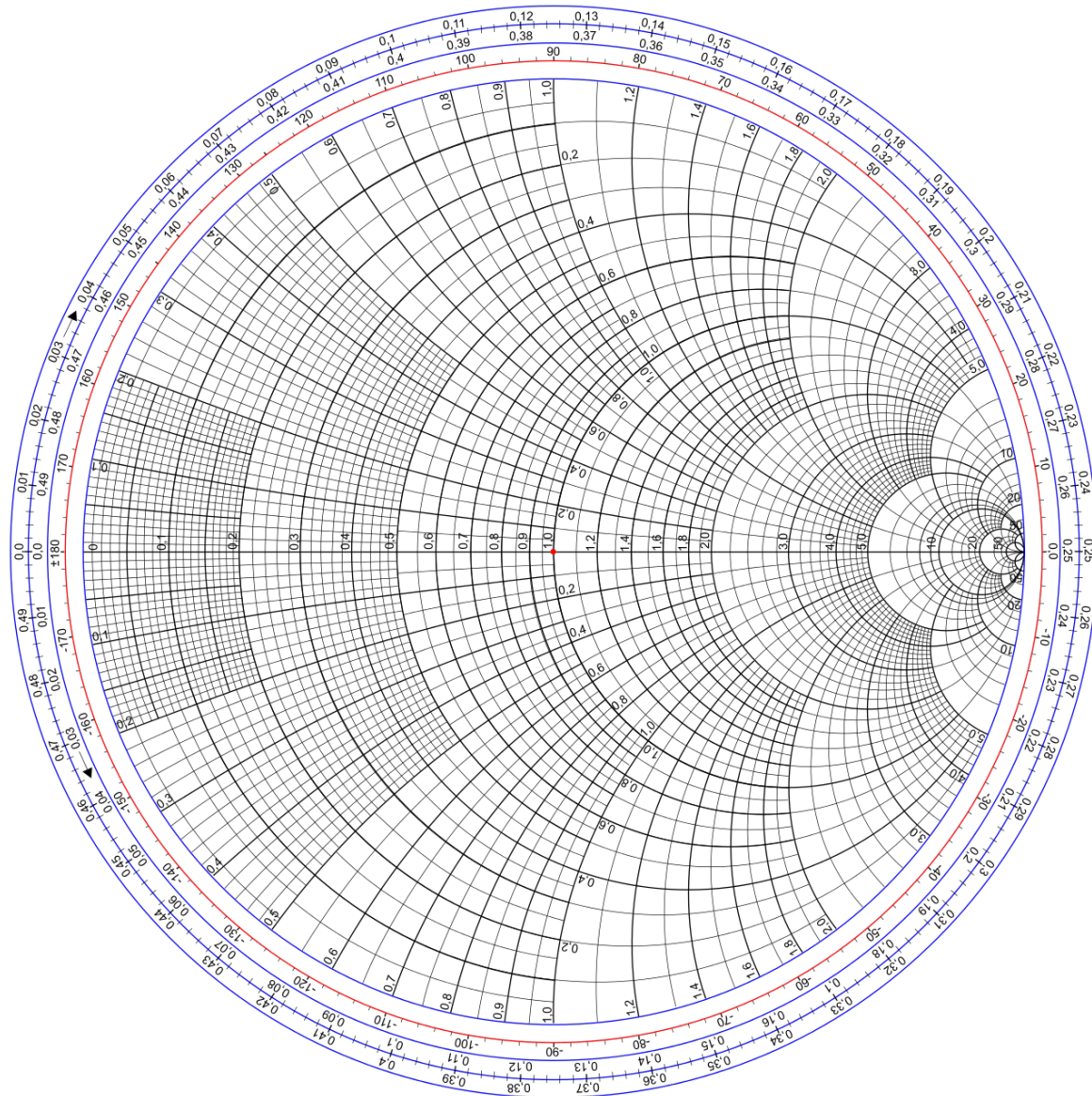


# Das Smith-Diagramm



# Erfinder des Smith-Diagramm



- Phillip Hagar Smith

\* 29. April 1905 in Lexington,  
Massachusetts

† 29. August 1987 in Berkeley  
Heights, New Jersey

war US-amerikanischer  
Ingenieur und erfand 1937 das  
Smith-Diagramm

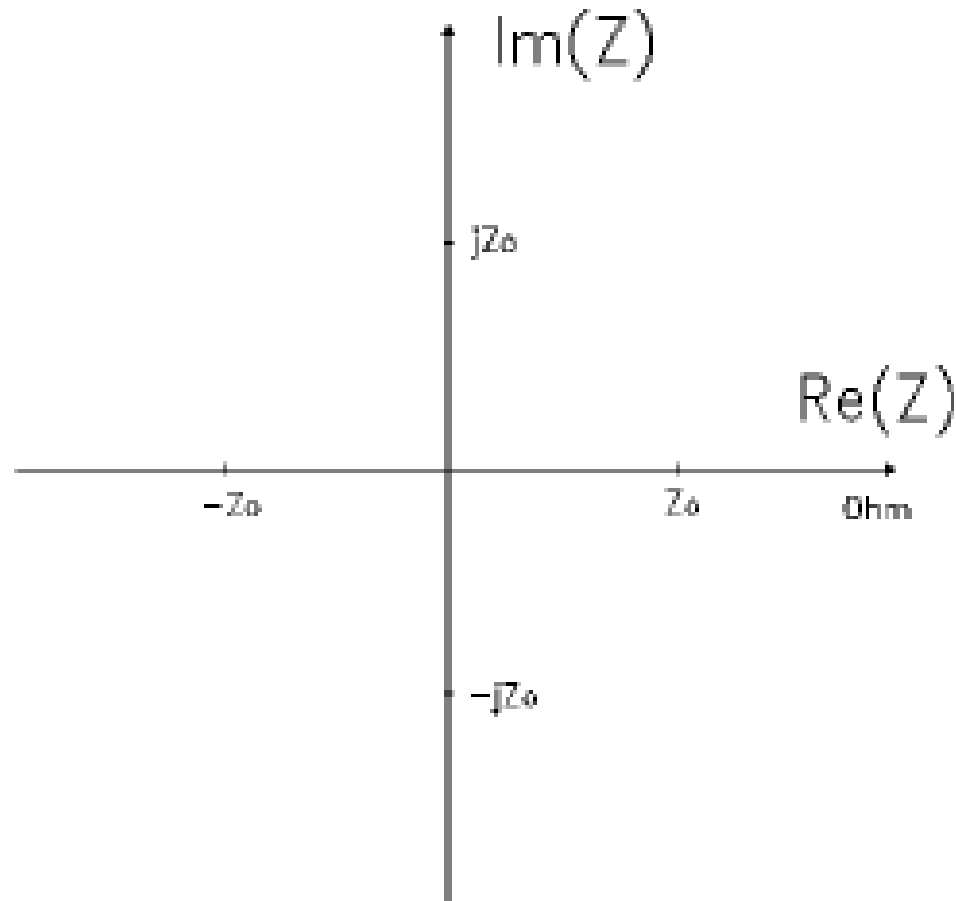
# Was ist das Smith-Diagramm?

- Hilfsmittel der komplexen Wechselstromrechnung, mit dem Berechnungen komplexer Widerstände (Impedanzen) auf eine geometrische Konstruktion zurückgeführt werden können.
- Hilfsmittel, das in der Leitungstheorie zur Impedanzanpassung verwendet wird.

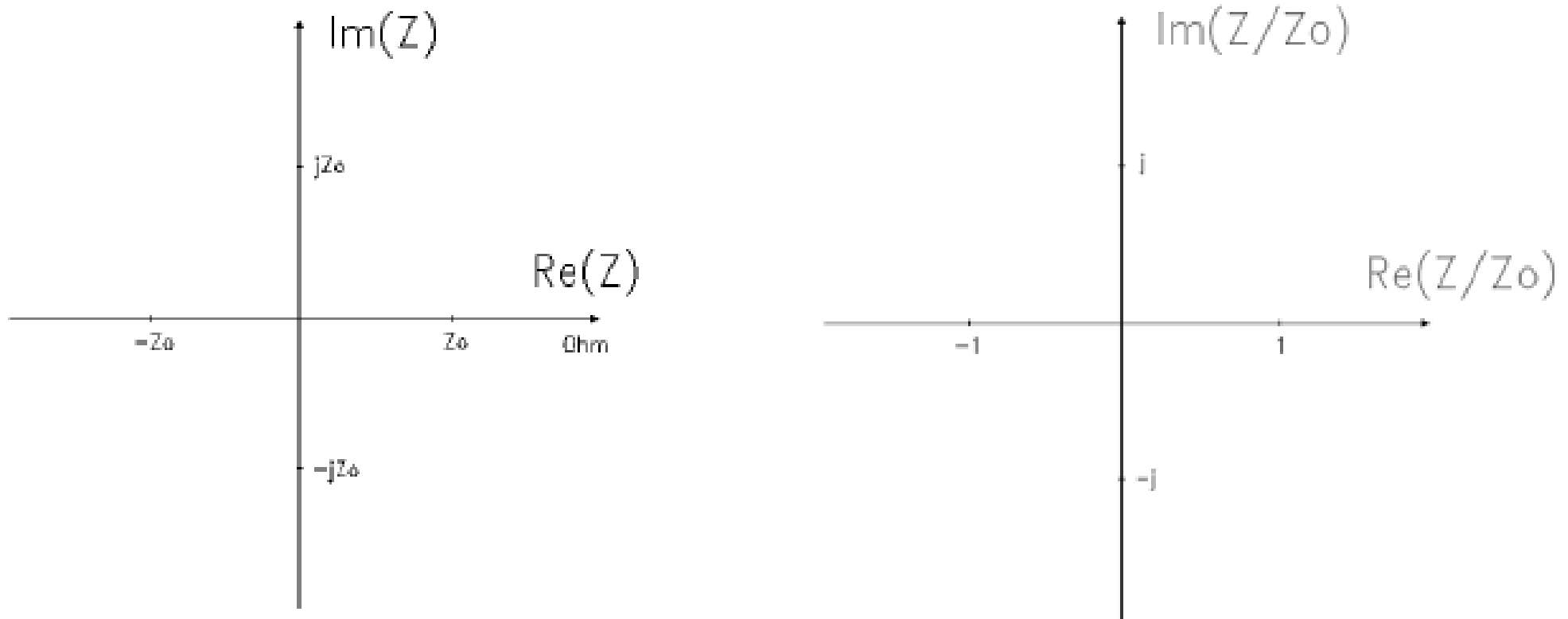
# Verwendung des Smith-Diagramms

- Smith-Diagramme auf Papier werden heute nur noch im Bereich der Ausbildung und zur Dokumentation verwendet.
- In der Praxis werden die Papierdiagramme inzwischen durch entsprechende Software ersetzt.
- Spezielle Messgeräte wie z.B. Netzwerkanalysatoren können gemessene Daten oft direkt in Form von Smith-Diagrammen anzeigen.

# Der Weg zum Smith-Diagramm (1)

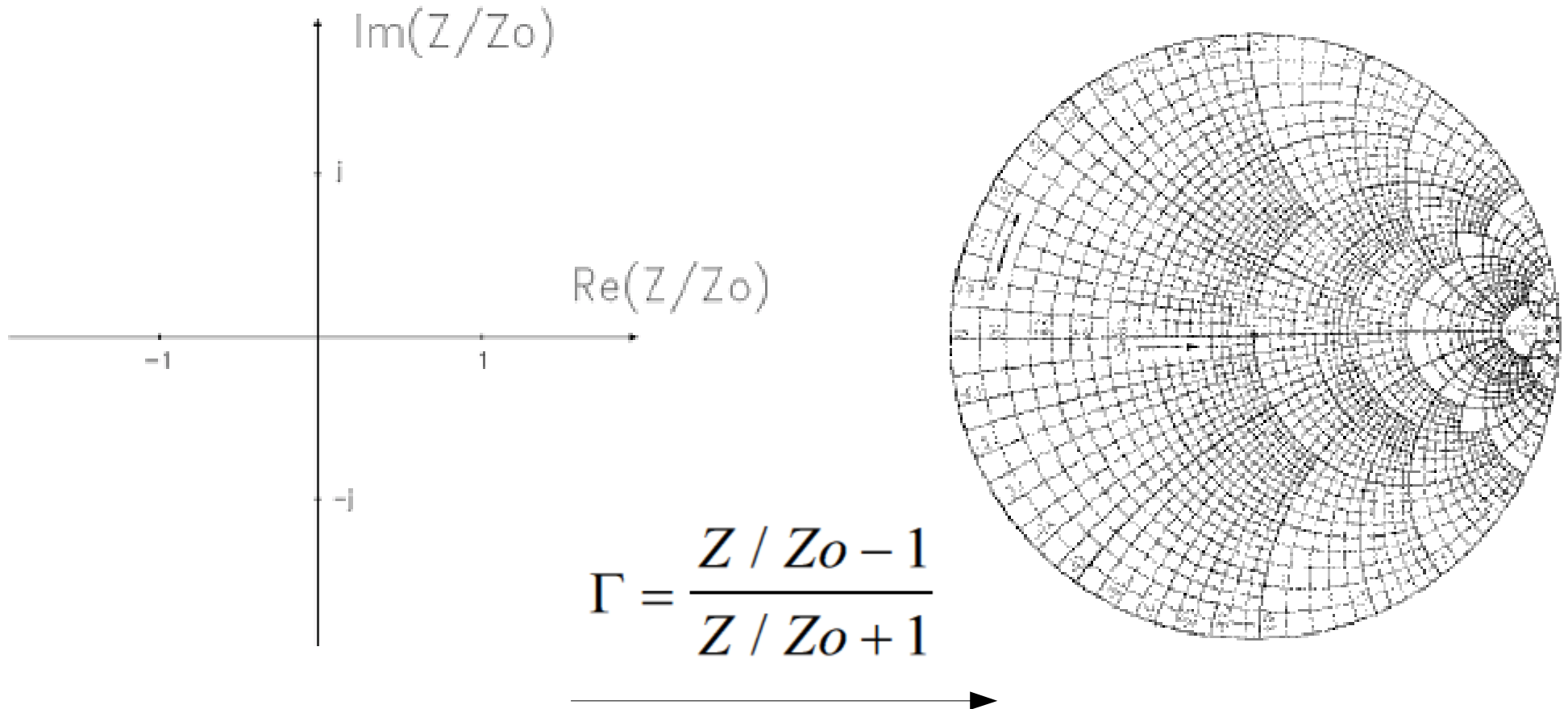


# Der Weg zum Smith-Diagramm (2)



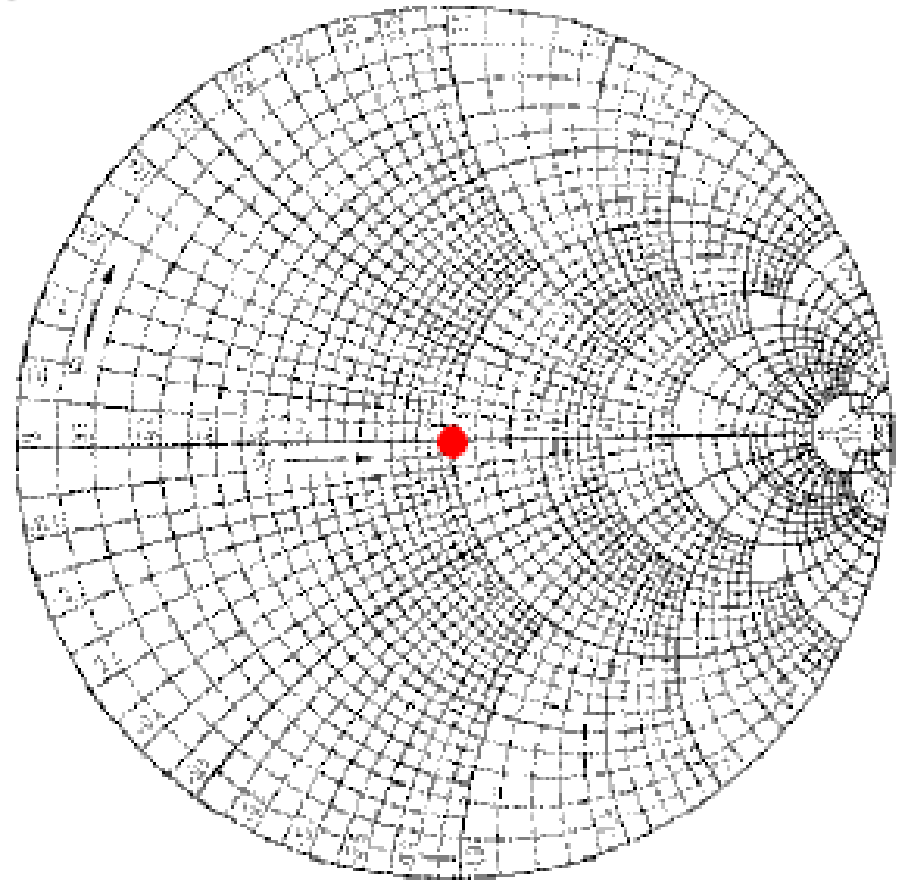
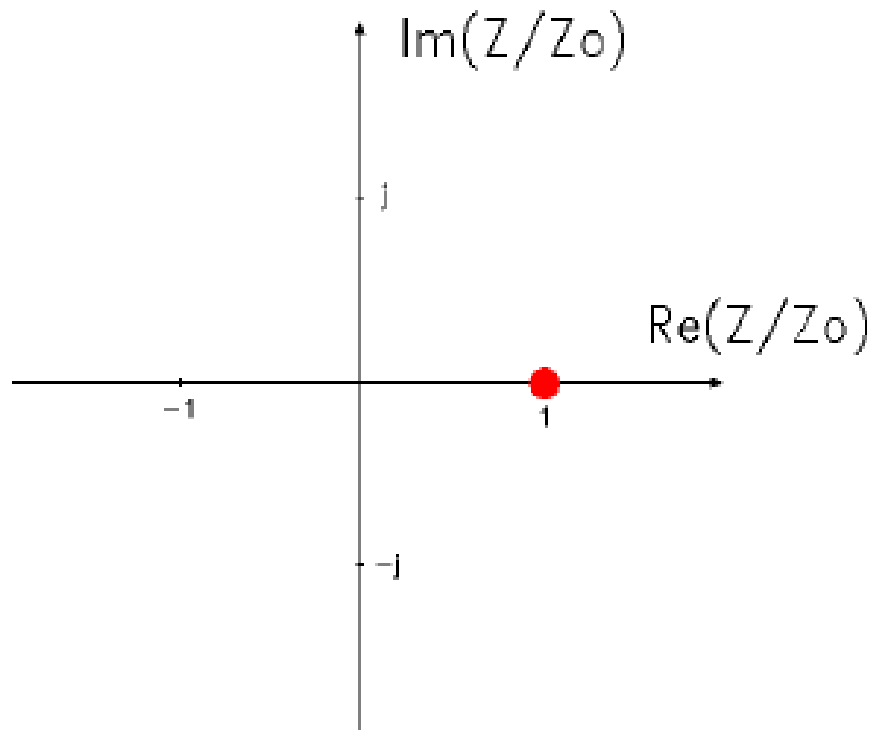
Normierung der Impedanzebene auf  $Z_0$  (meistens 50 Ohm)

# Der Weg zum Smith-Diagramm (3)



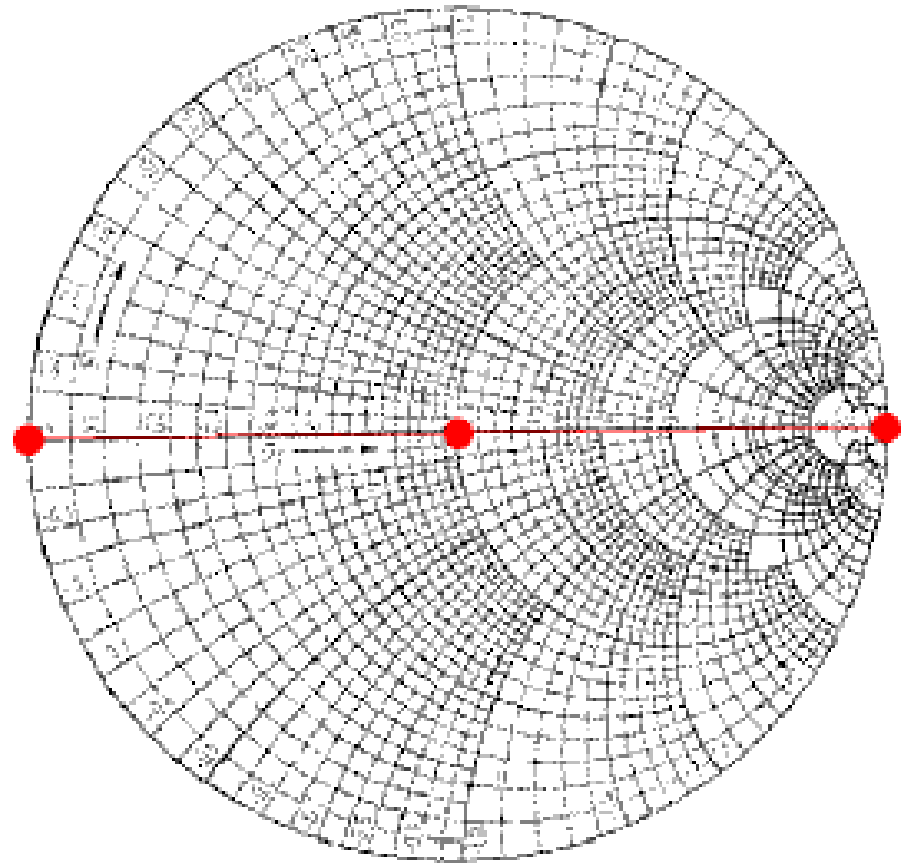
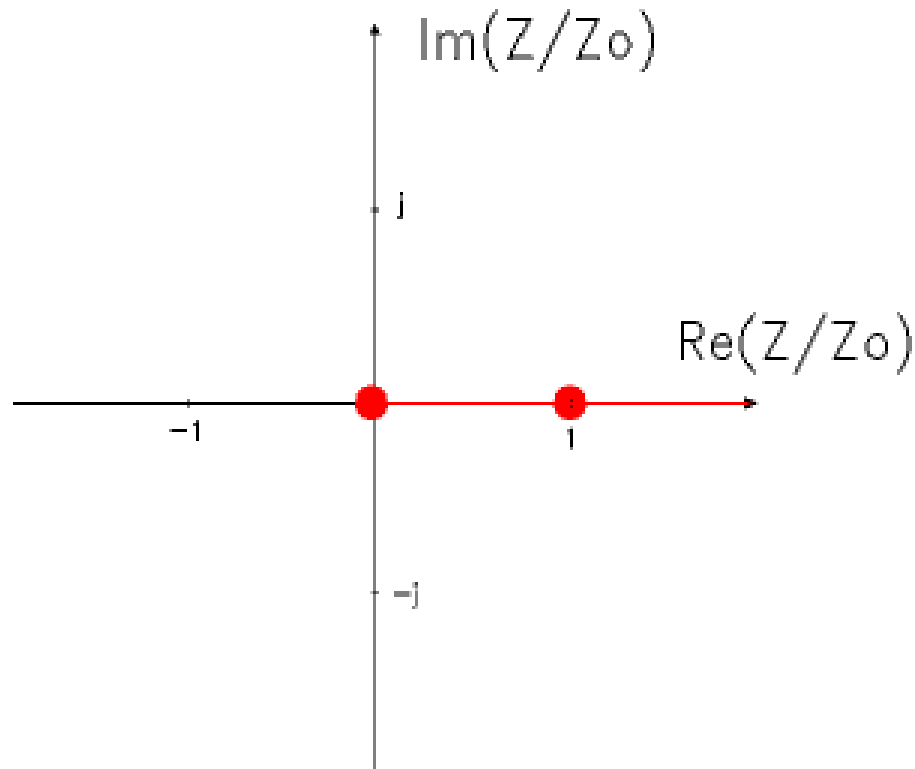
Transformation der normierten Impedanzebene  
in die Reflektionsfaktorebene

# R, L, C im Smith-Diagramm

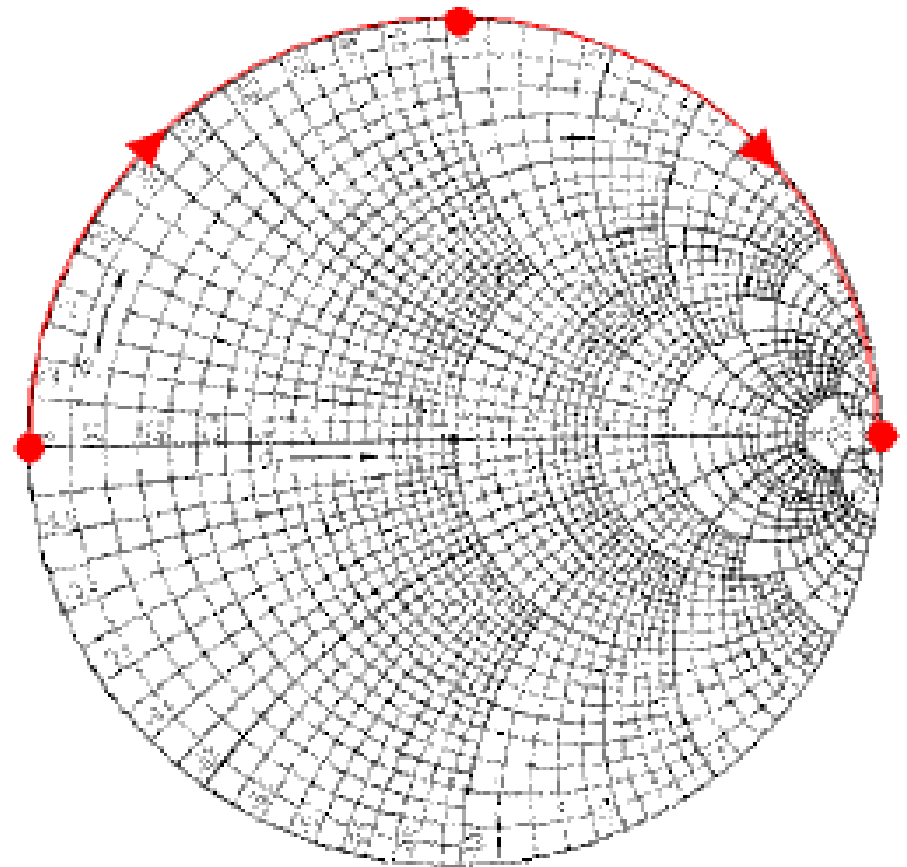
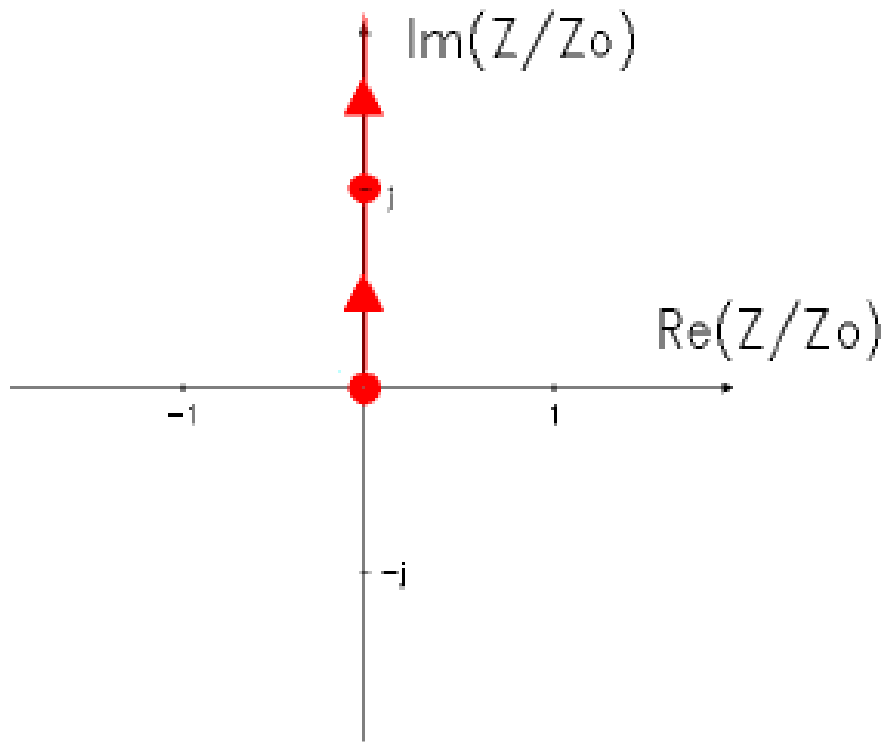




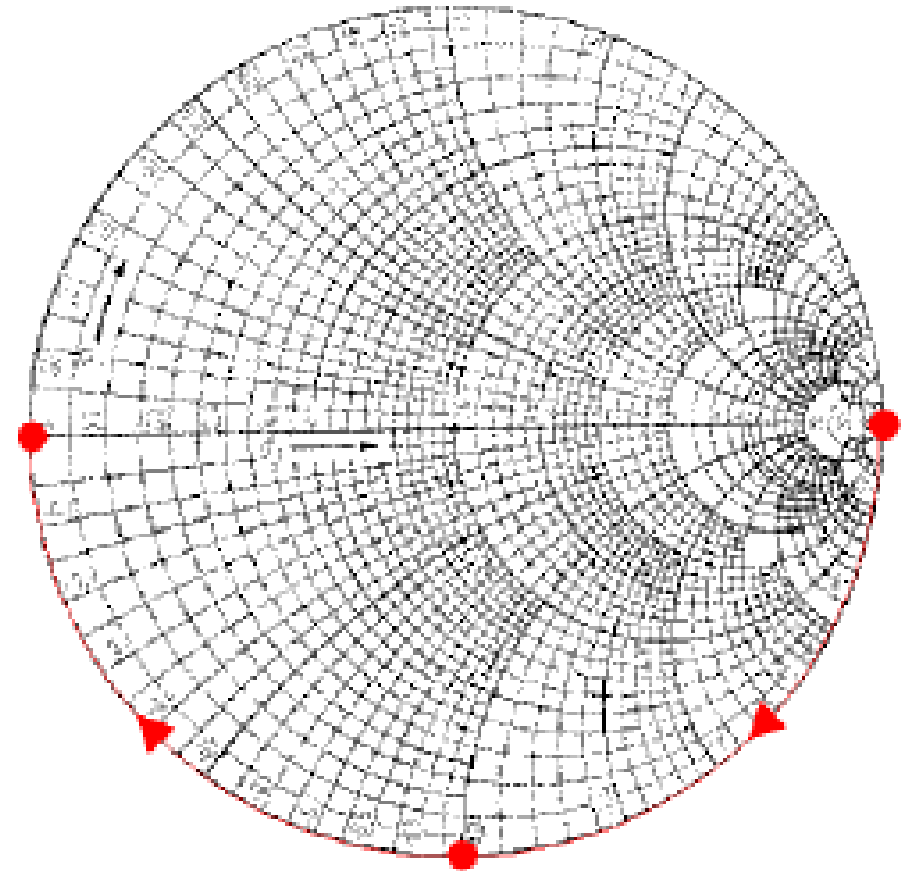
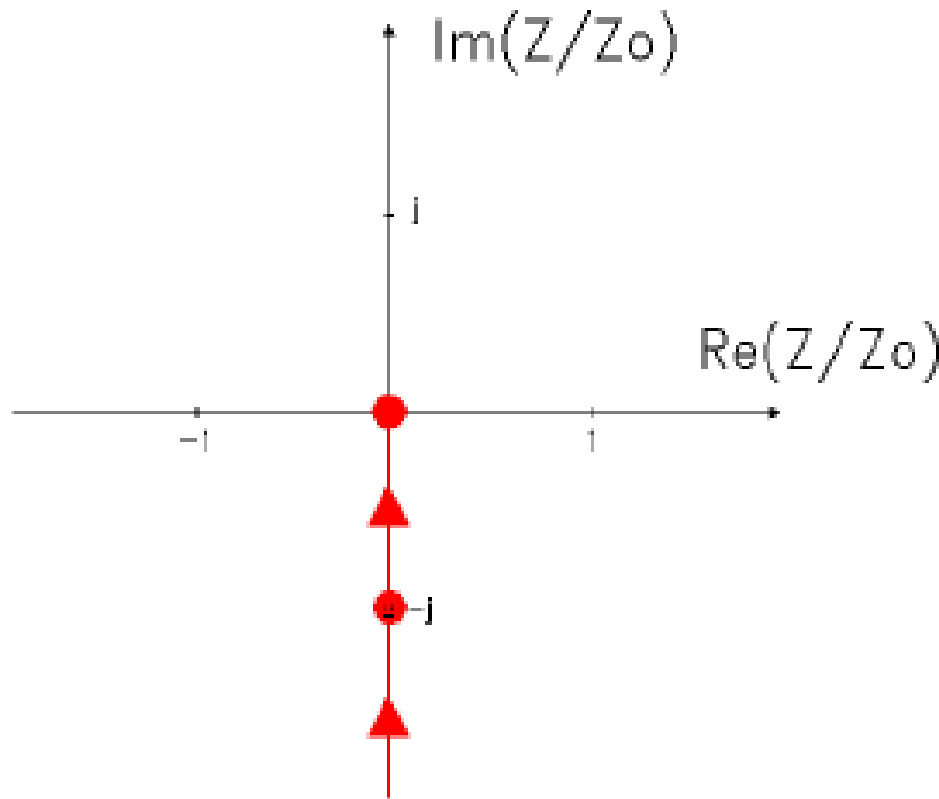
# R, L, C im Smith-Diagramm



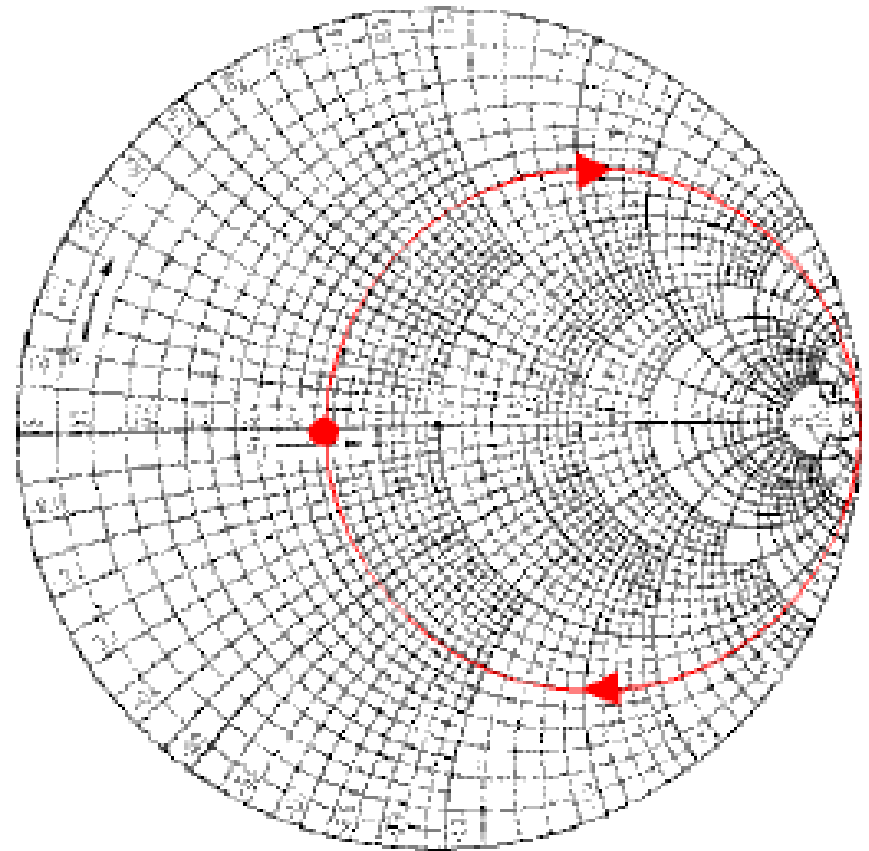
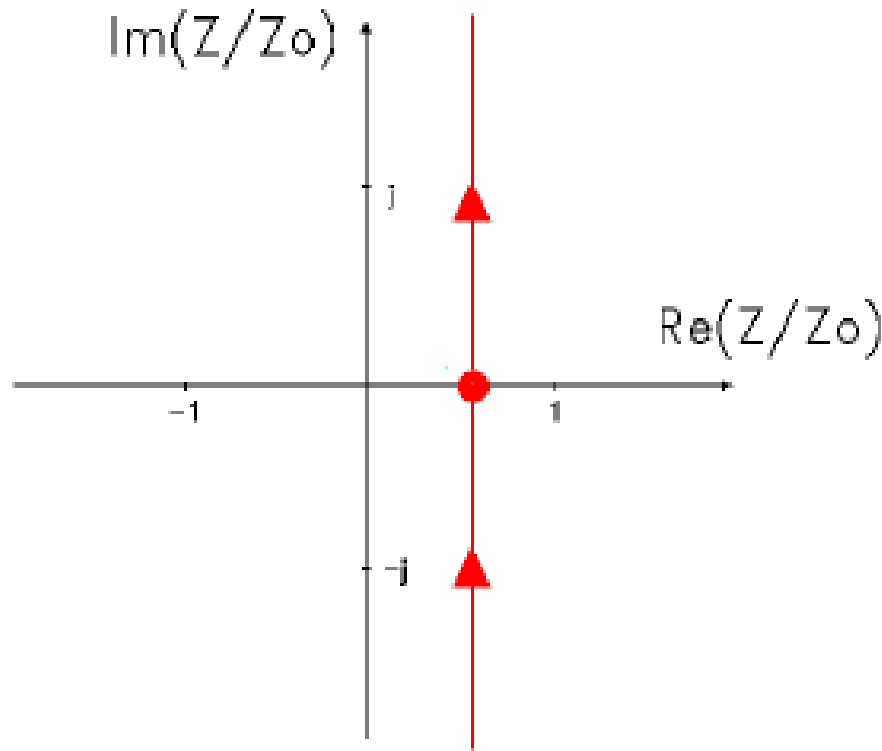
# R, L, C im Smith-Diagramm



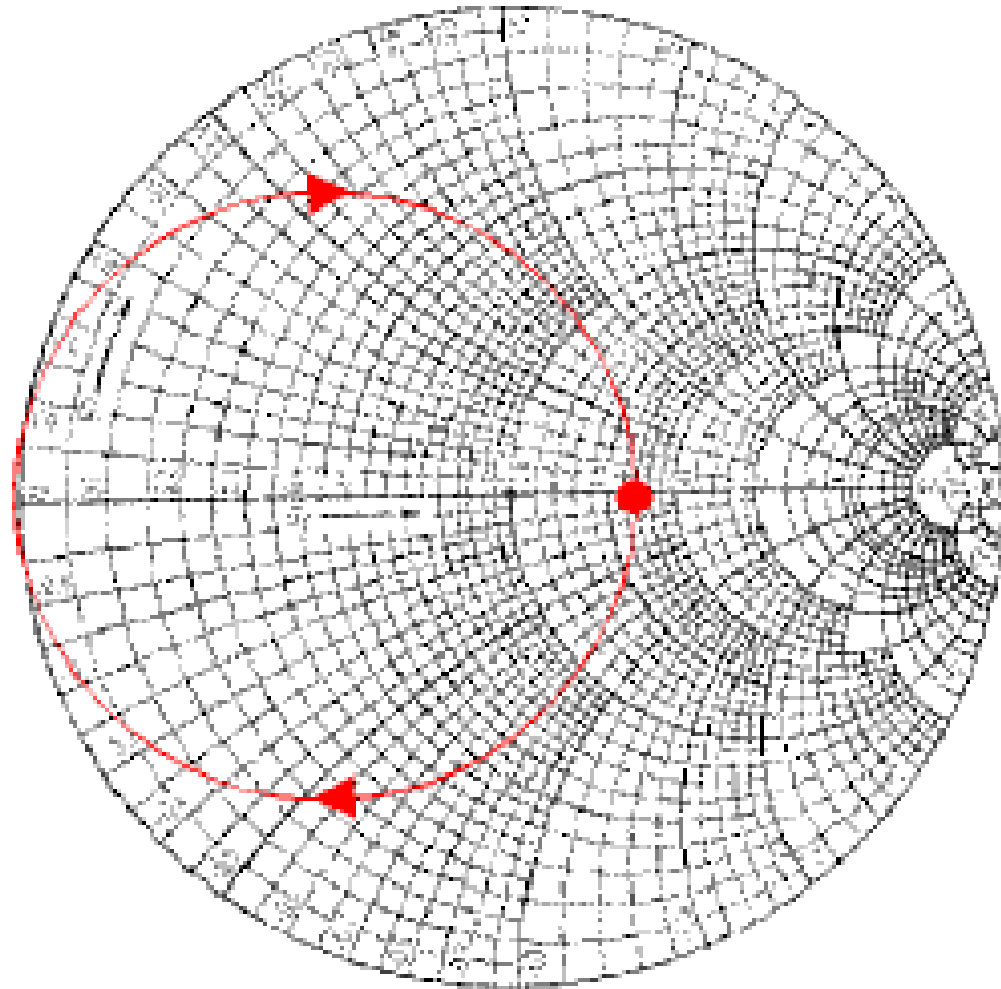
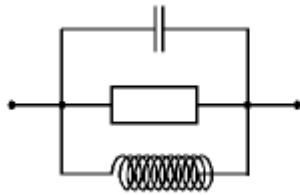
# R, L, C im Smith-Diagramm



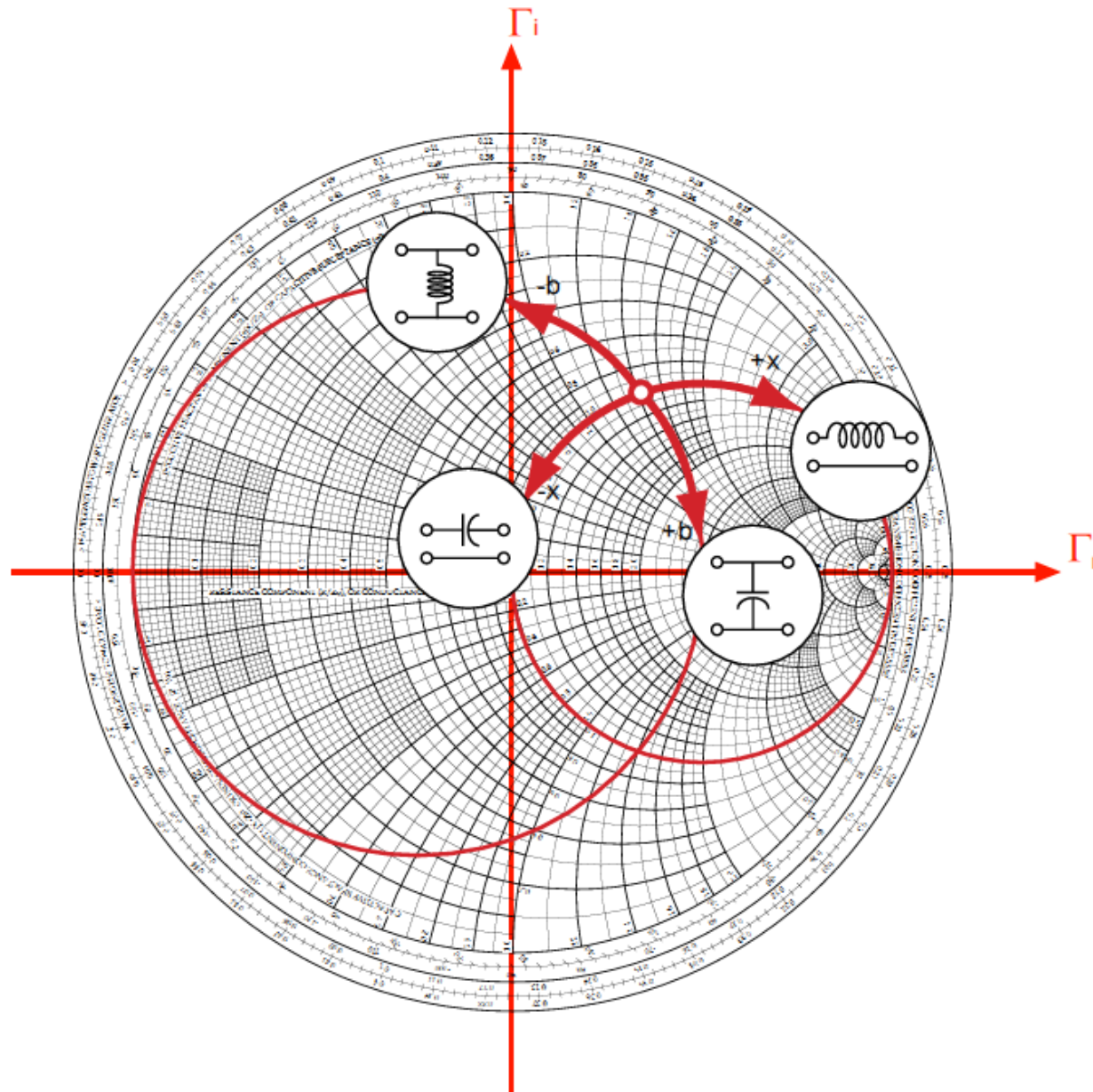
# Serienschaltung im Smith-Diagramm



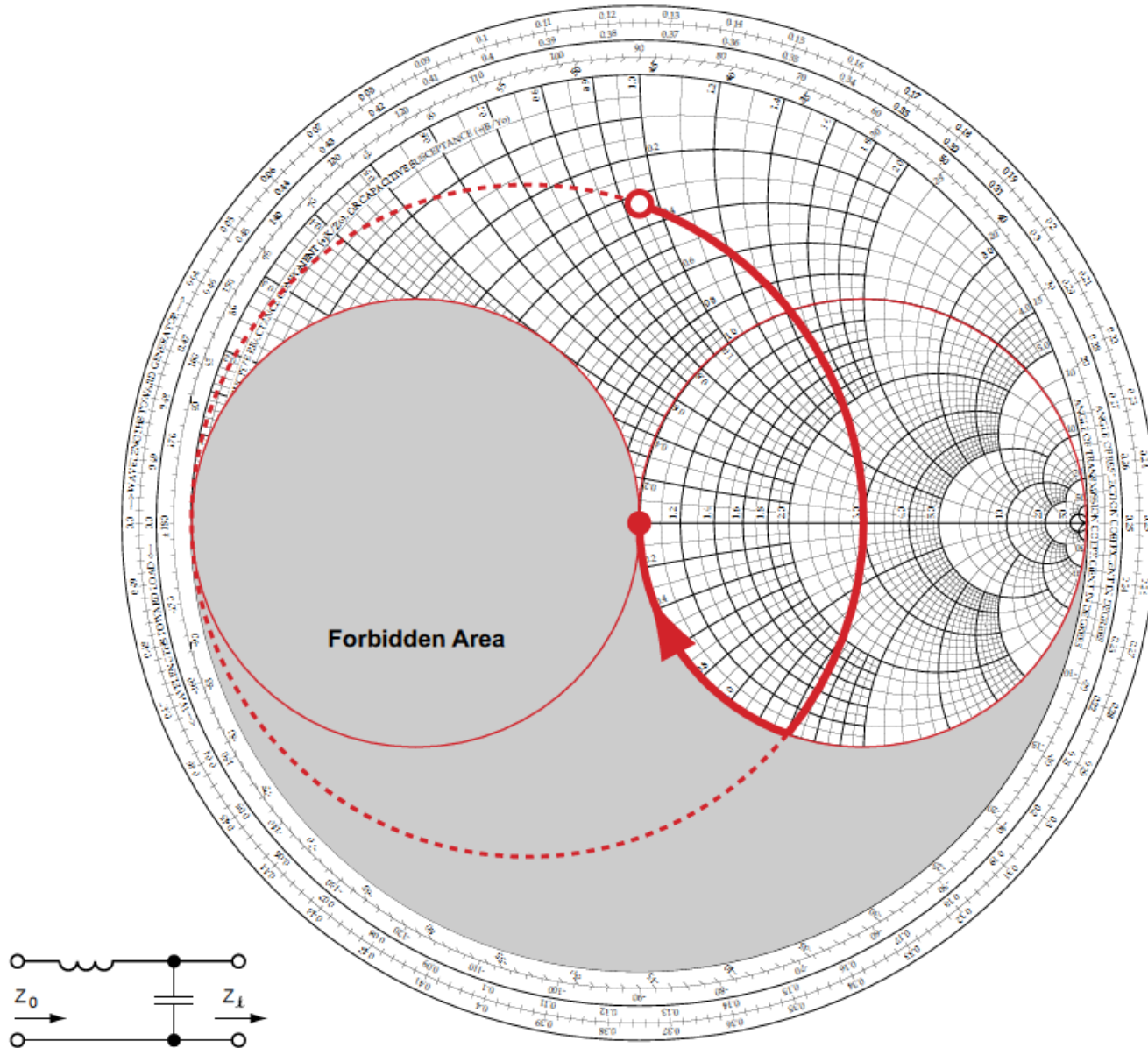
# Parallelschaltung im Smith-Diagramm



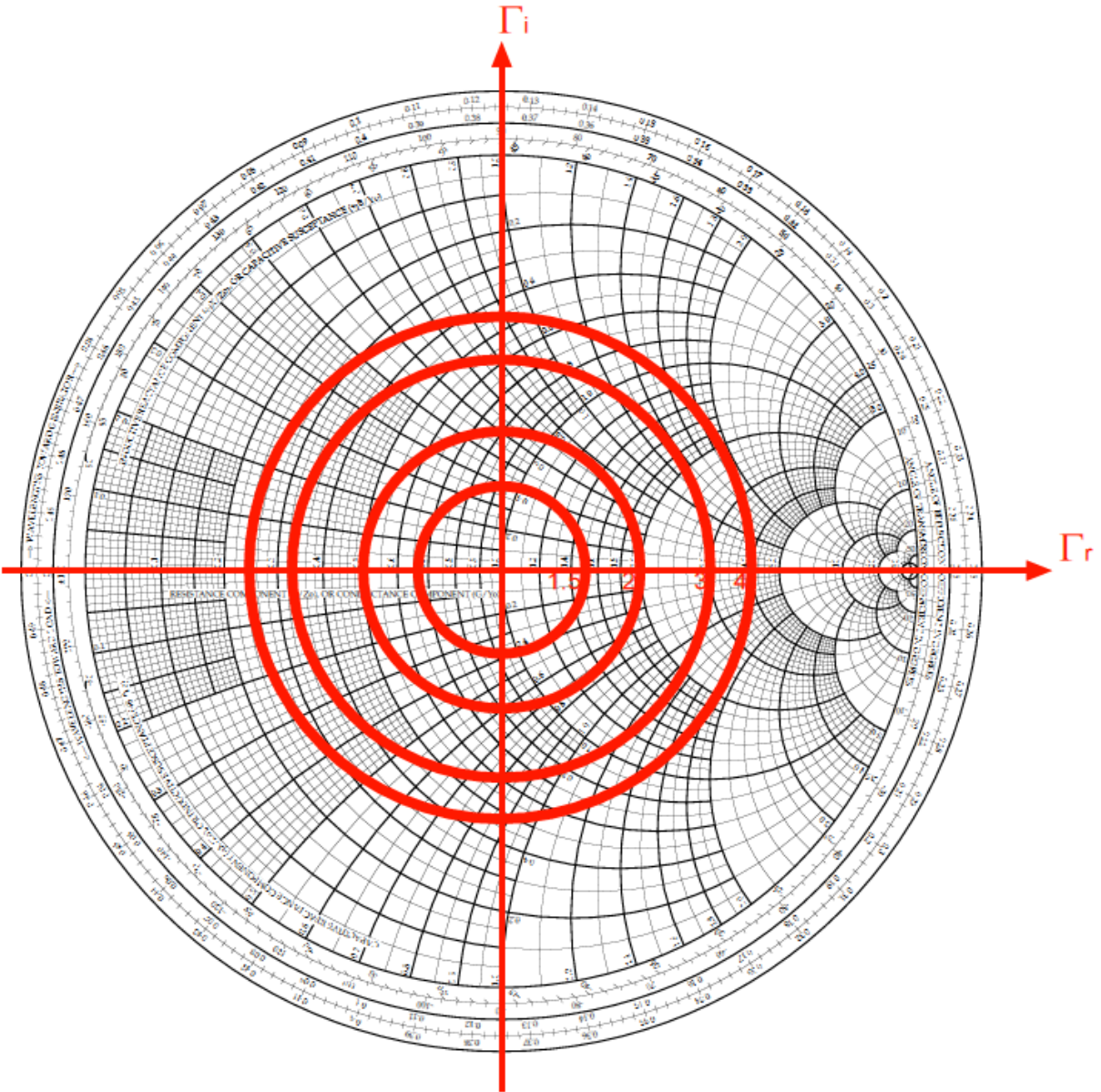
# R, L, C im Smith-Diagramm



# Anpassung im Smith-Diagramm



# Das SWR im Smith-Diagramm

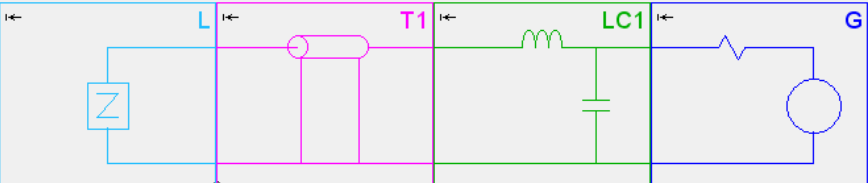




# Software für Smith-Diagramme

C:\Users\Michael\Desktop\Amateurfunk\SimSmith\SimSmithSamples\SimSmithSamples\extendedDoubleZepp\edZepp.ssx - SimSmith 17.2 n by AE6TV- Java:1.8.0\_241

SimSmith file savelimages captures view help running notes

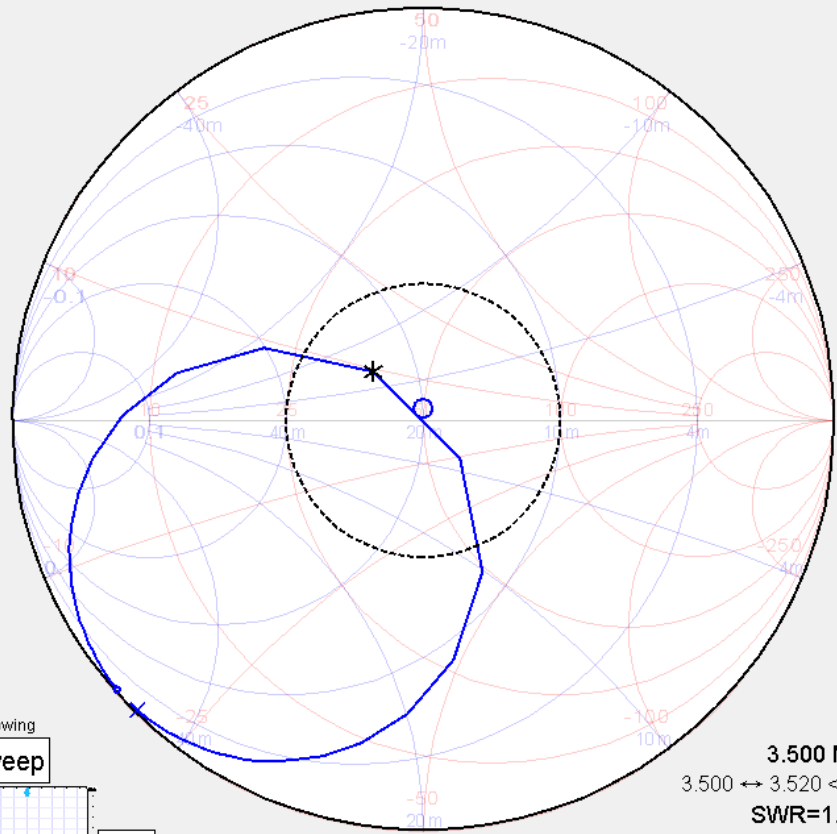


$R = 9.73$        $R = 6.218$        $R = 49.85$       SWR = 1.056  
 $X = -1.45K$        $X = -95.32$        $X = 2.725$        $\Gamma = 27.3m \angle 92$   
 $\uparrow W = 0.107$        $\uparrow W = 0.808$        $\uparrow W = 84.0m$

$\uparrow V_i = 152.3, 0.105$        $V_i = 36.65, 0.3837$        $\leftrightarrow v_i = 43.15, 0.3837$

9.73	ohms	174.3	-deg	manual	mode	3.51	MHz
-1.45K	ohms	10	@MHz	low	pass	50	Zo
LastZ.txt	file	13.08	mtrs	series	shunt	useZo	V
		(551 LL)	Mdl	2.239n	F	Plots	Plt
		0.902	VFnom	5.099u	H		
		400	Zo	2K	Qc		
		0.25	k0	200	Ql		
		44.56m	k1				
		1.2m	k2				

type numPnts from to name sweep  
 lin 100 1 30 G.MHz n  
 LastZ.txt clr L.file y

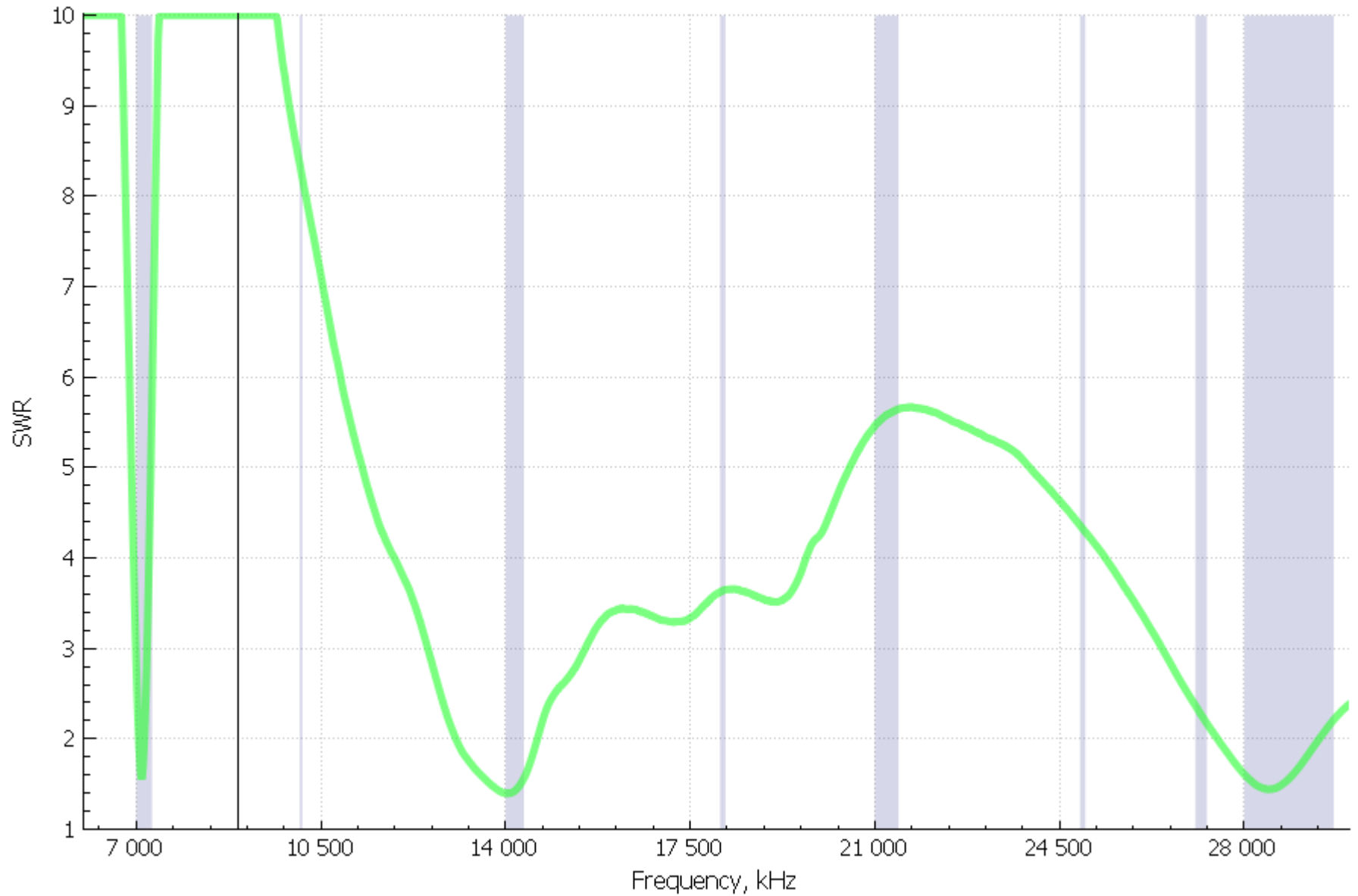
G: SWR < 2.00  $\Delta 20.0m$  3.500 3.520 MHz

showing Sweep

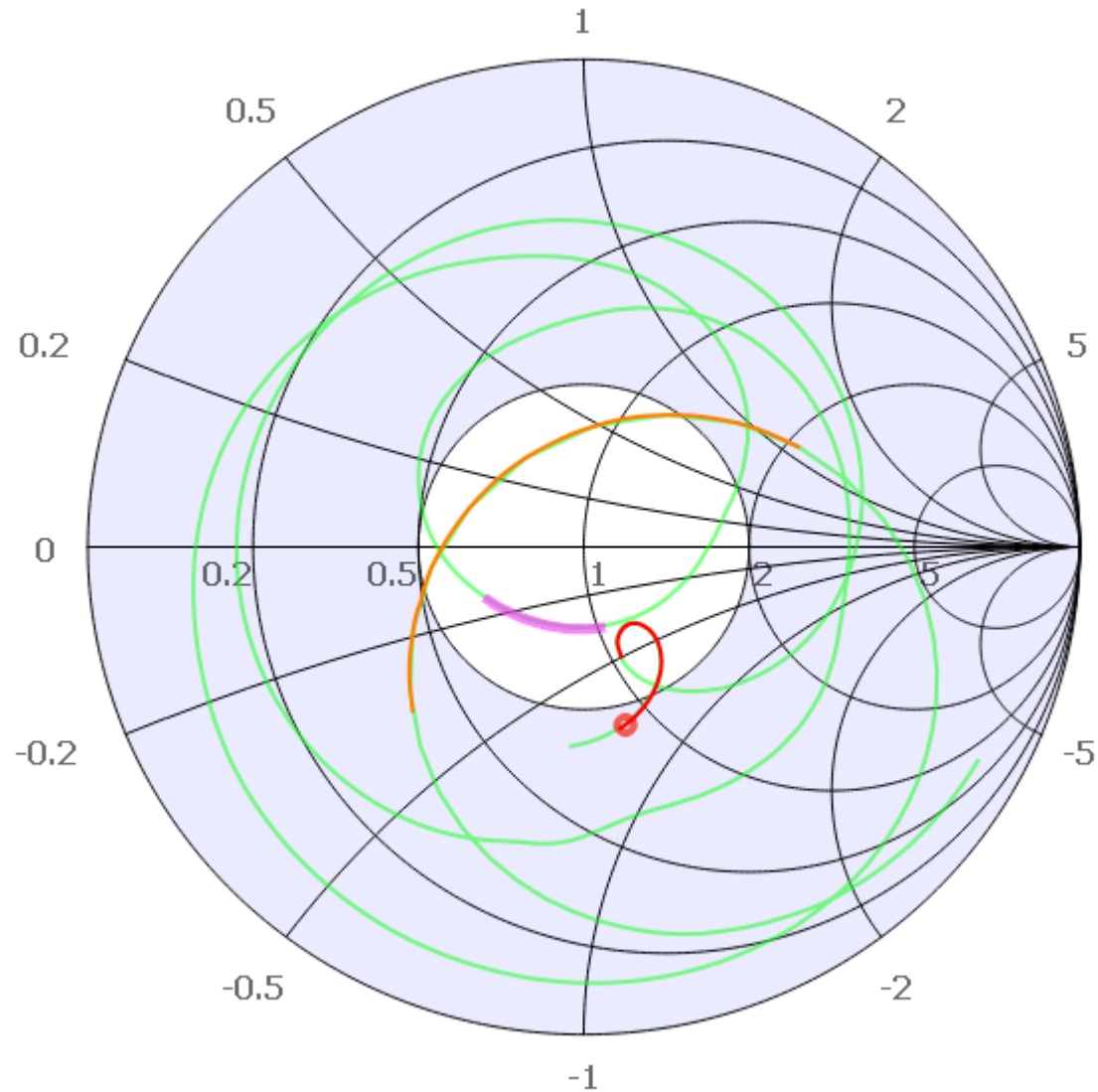
0	Q	Plt	L revZ
2	swr	Plot	L revZ
Mark			L revZ

3.500 MHz  
 3.500  $\leftrightarrow$  3.520 < 2.00  
 SWR = 1.409  
 $\Gamma = 0.170 \angle 136$   
 $Z = 38.2 + j9.31$   
 $Y = 24.7m - j6.03m$

# SWR-Messung 40-20-10 EF

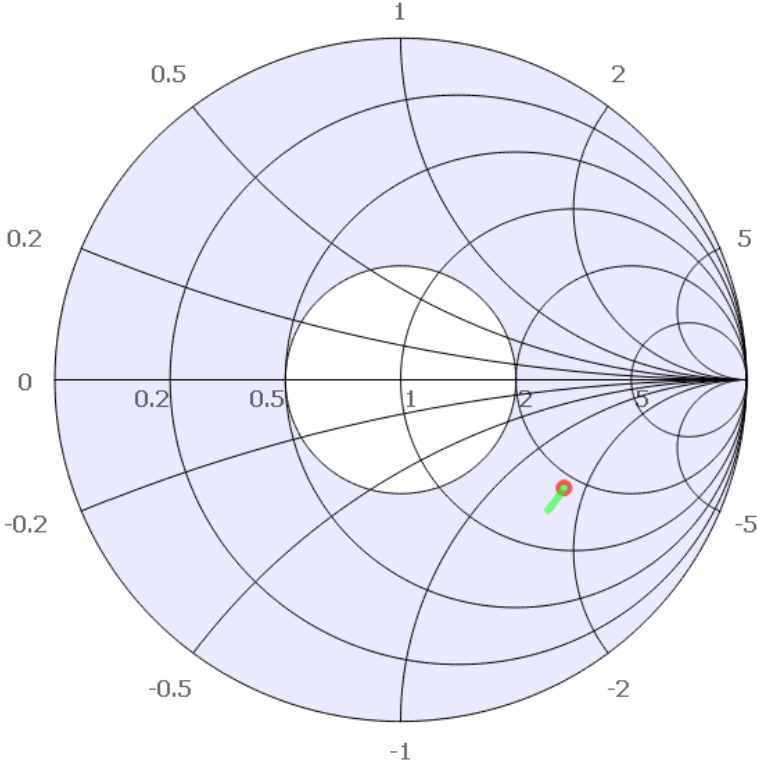
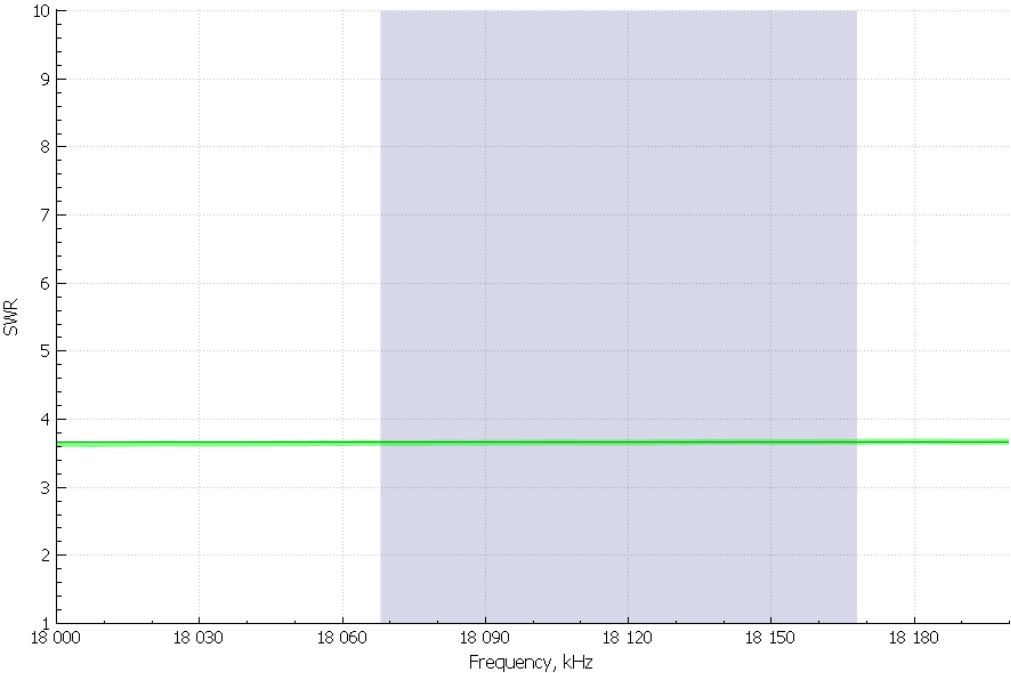


# Smith-Diagramm aus VNA



6-30 MHz

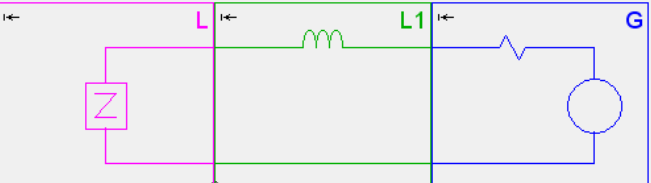
# 17m-Band



# 17m-Band Anpassen

C:\Users\Michael\lastSimSmithCircuit\17p2.ssx - SimSmith 17.2 n by AE6TY- Java:1.8.0\_241

SimSmith file savImages captures view help running notes

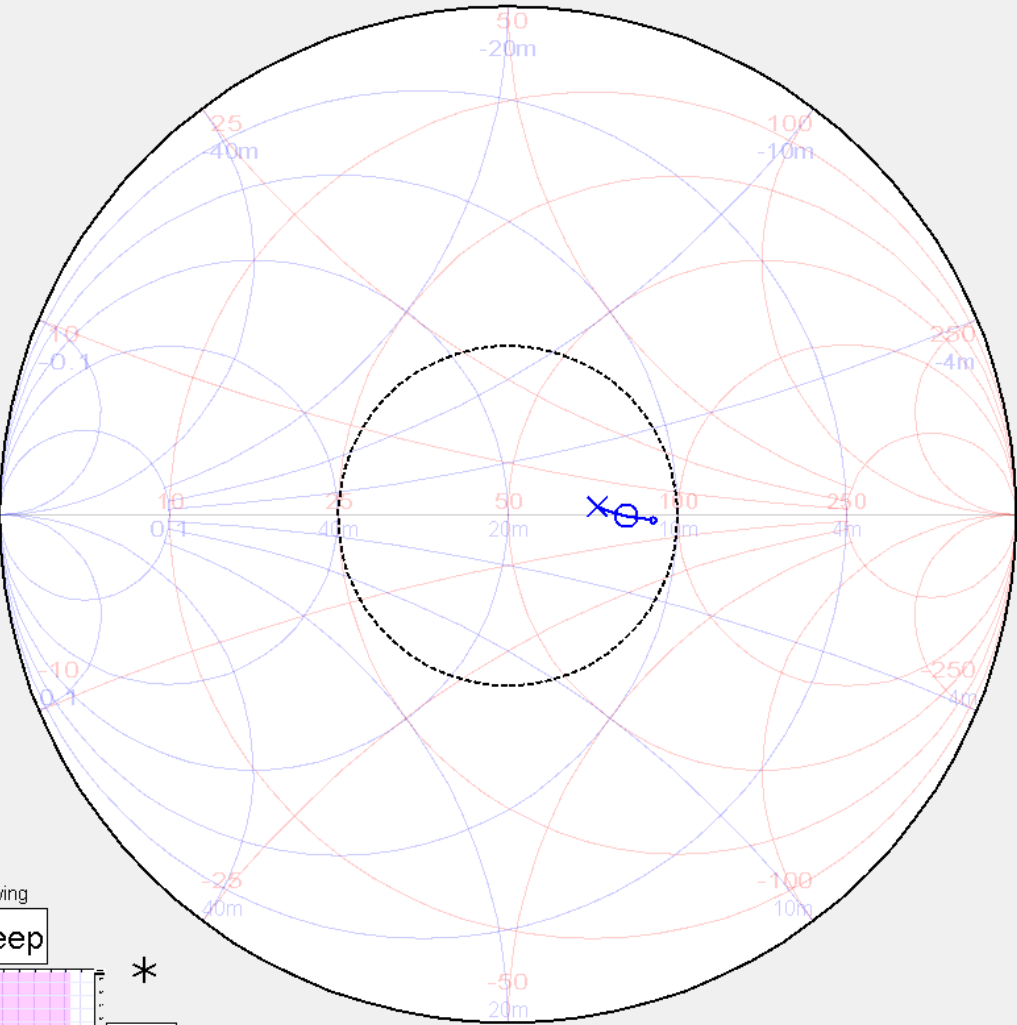


$R = 79.95$        $R = 80.36$        $SWR = 1.607$   
 $X = -82.65$        $X = -0.4099$        $\Gamma = 0.233 \angle -0.59$   
 $\leftarrow W 0.941$        $\leftarrow W 0.946$   
 $\uparrow V_i = 12.47, 0.1085$        $\leftrightarrow V_i = 8.922, 0.1085$

79.95 ohms	723.1nH	18.1 MHz
-82.65 ohms	200Q	50 Zo
17m.s1p file	0@MHz	useZo V
		Plots Pit

type	numPnts	from	to	name	sweep
lin	100	18	18.2	G.MHz	y
		17m.s1p	clr	L.file	n

G: SWR=2.00 @0.200 18.00 18.20 MHz

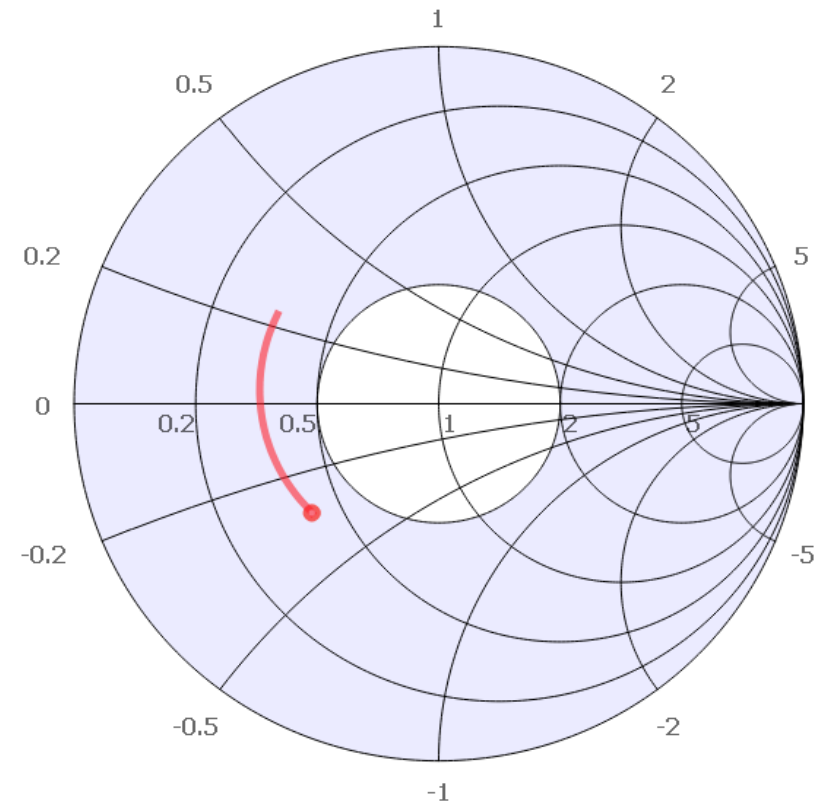
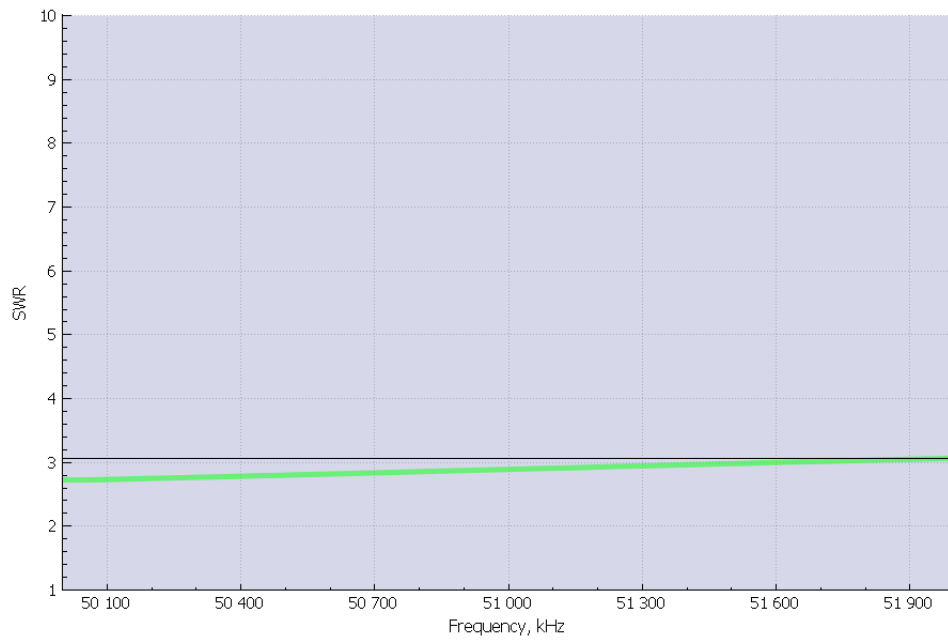


showing Sweep \*

0 Q  
2 SWR

Mark Plot

# 6m-Band



# 6m-Band anpassen

