



**Instituto Tecnológico de Costa Rica**  
**Ingeniería en Computadores**

**Curso: Procesamiento Digital de Señales**

**Tarea 3**

**Grupo: junra\_t3**

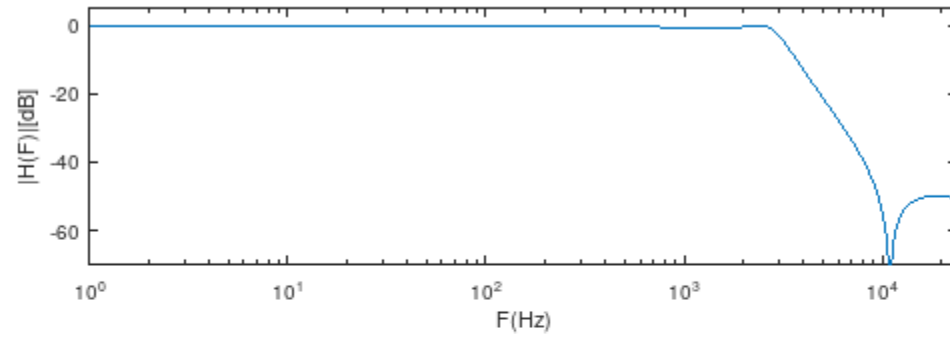
**Estudiantes:**

**Juan Pablo Rodriguez Cano -**

**Randall Samuel Méndez Loria - 2017147899**

## Ellip Lowpass

Respuesta en magnitud



Respuesta de fase

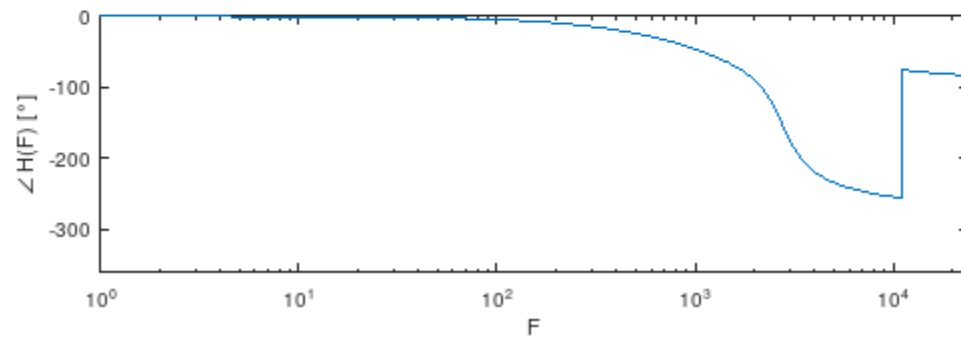
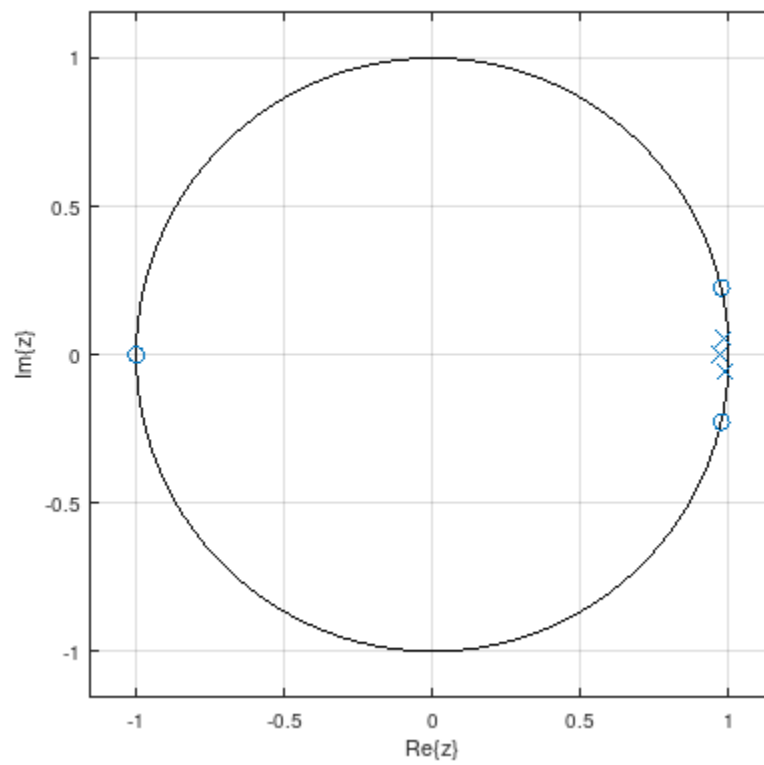
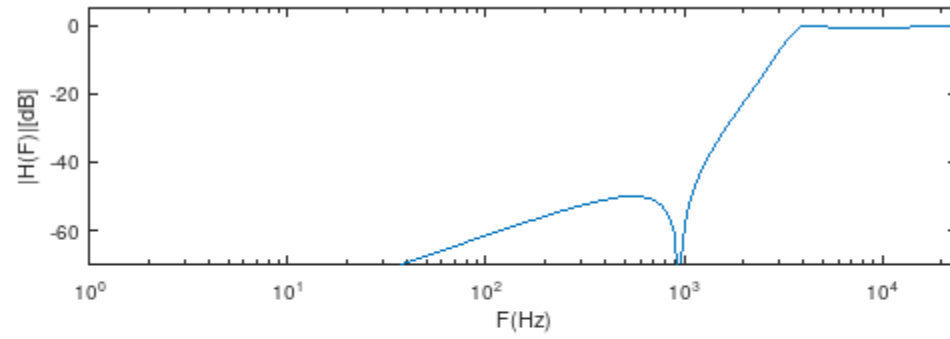


Diagrama de Polos



## Ellip Highpass

Respuesta en magnitud



Respuesta de fase

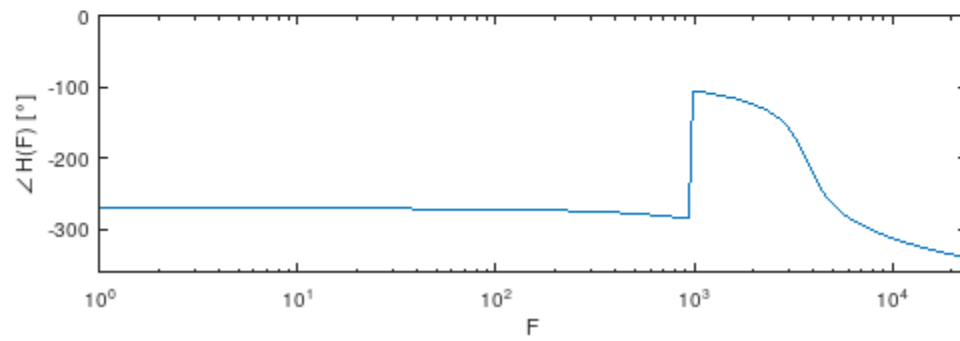
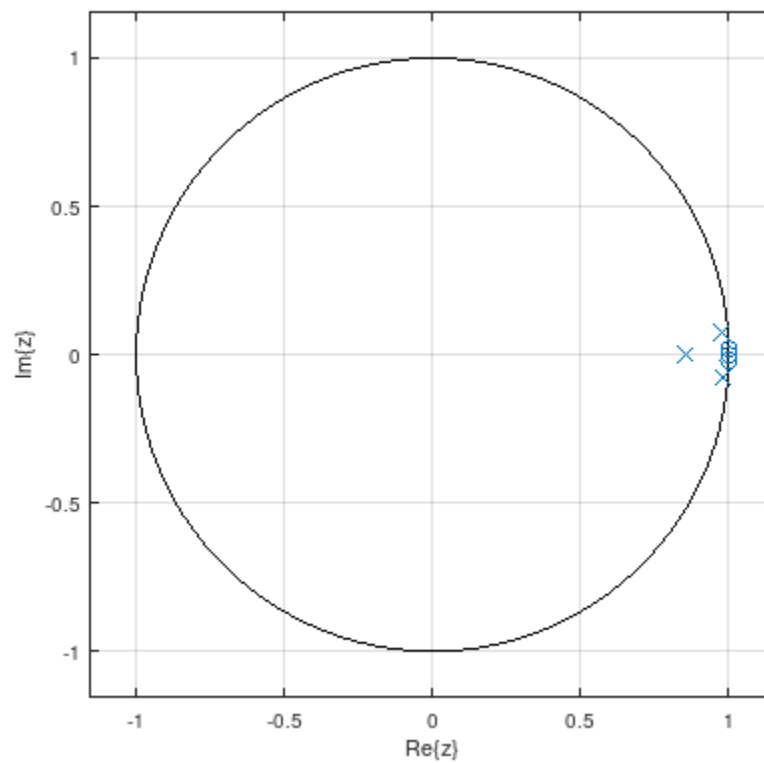
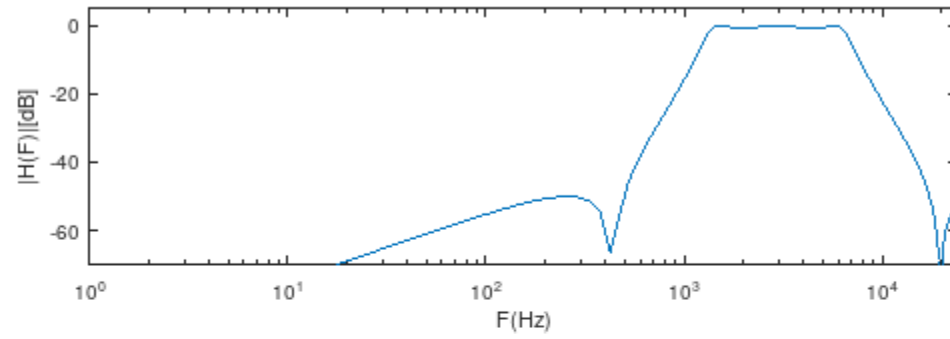


Diagrama de Polos



## Ellip Bandpass

Respuesta en magnitud



Respuesta de fase

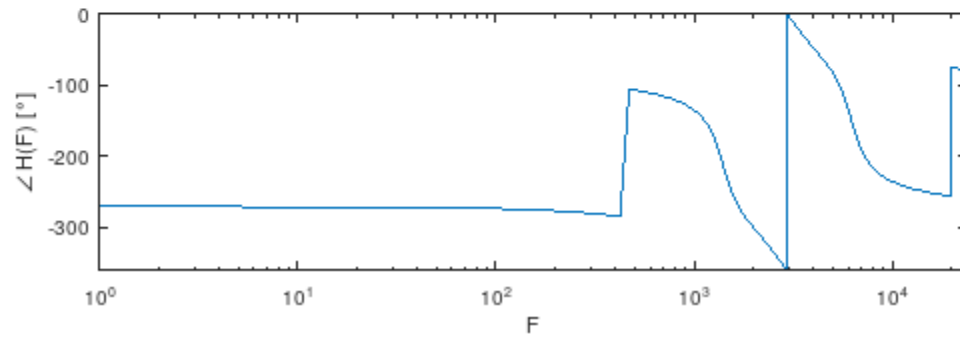
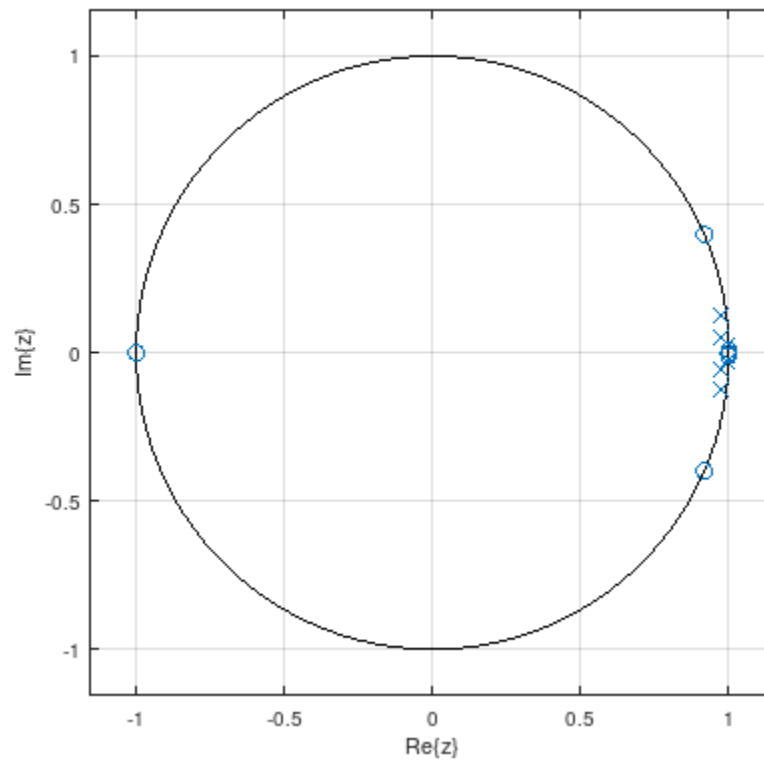
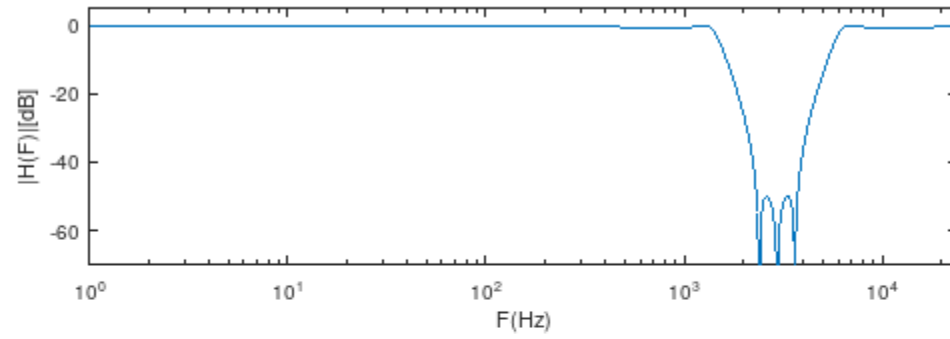


Diagrama de Polos



## Ellip Bandstop

Respuesta en magnitud



Respuesta de fase

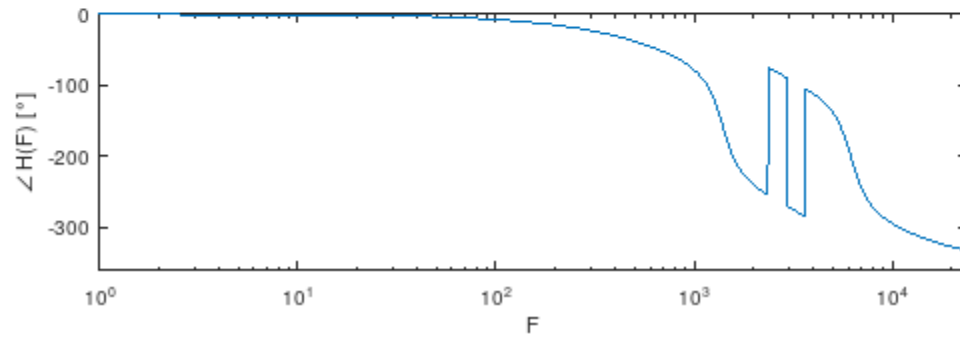
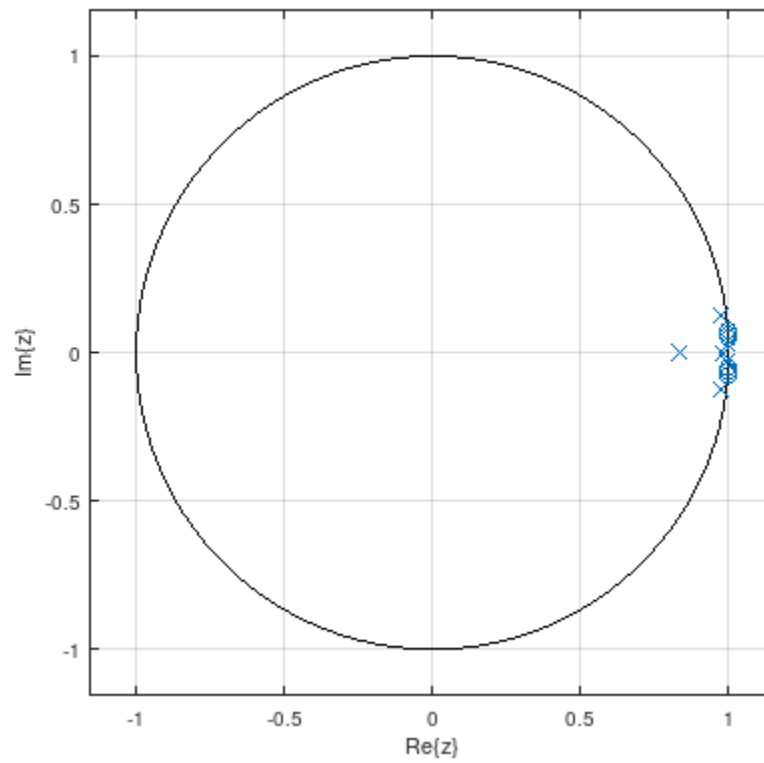
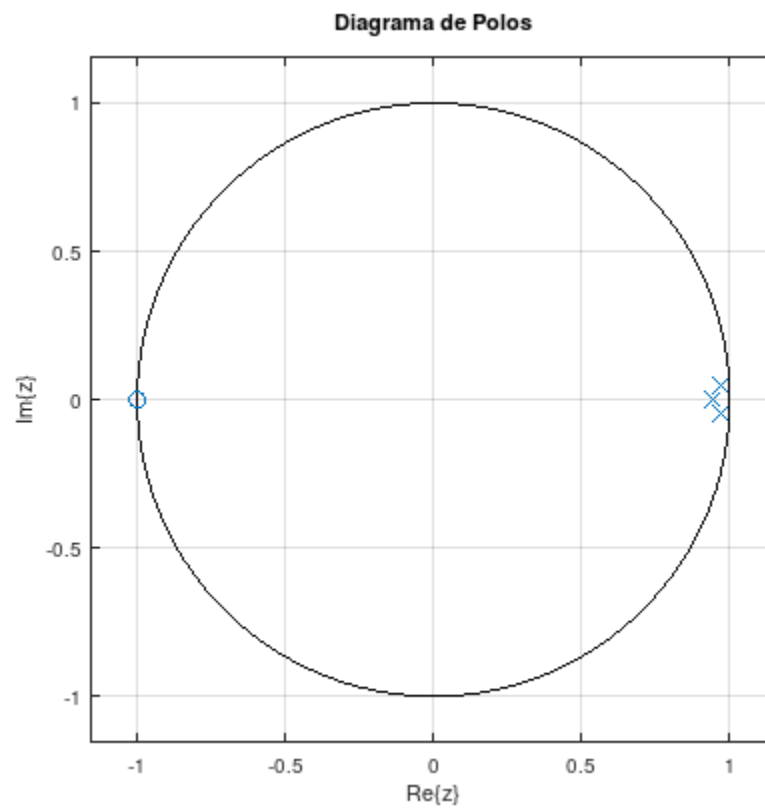
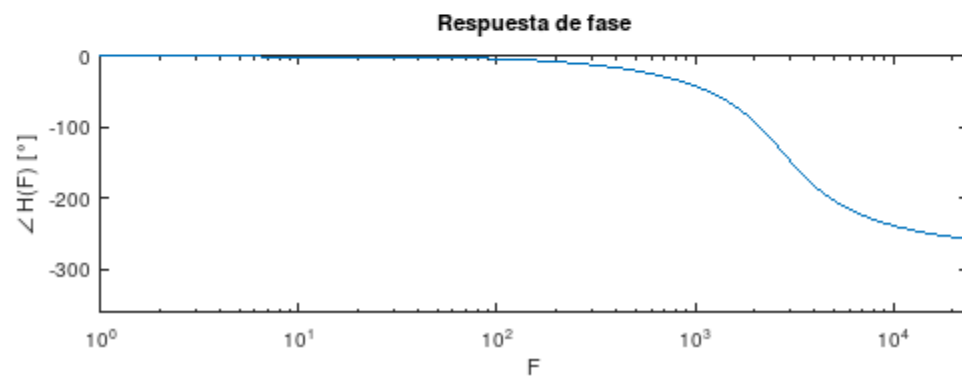
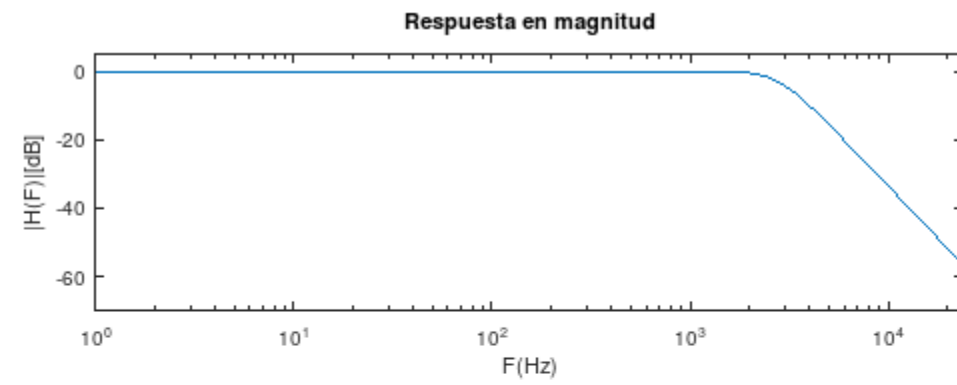


Diagrama de Polos

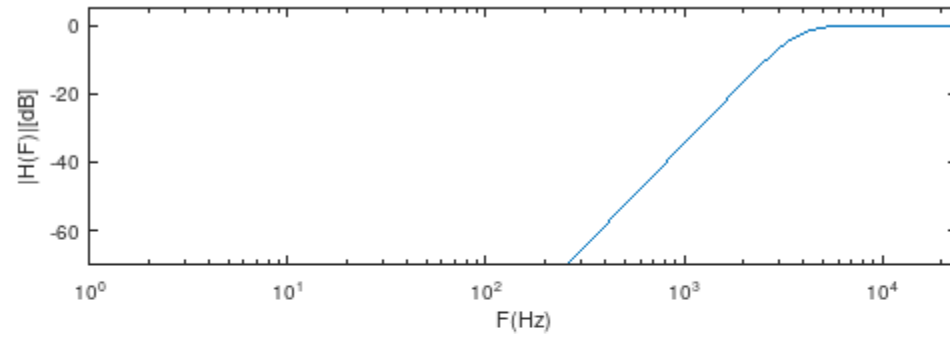


## Butter Lowpass



## Butter Highpass

Respuesta en magnitud



Respuesta de fase

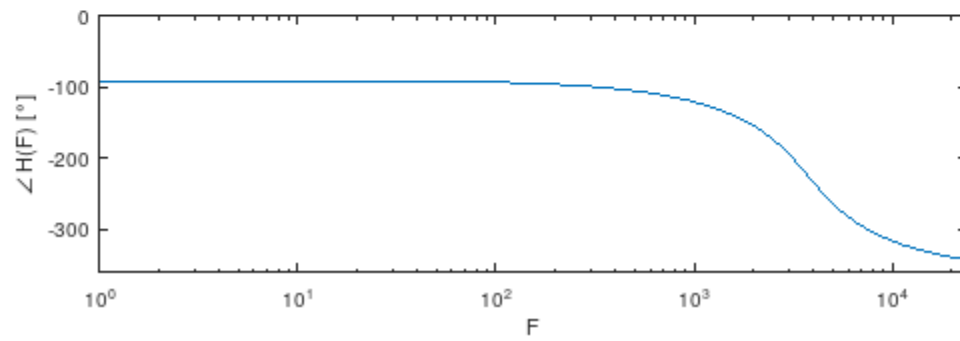
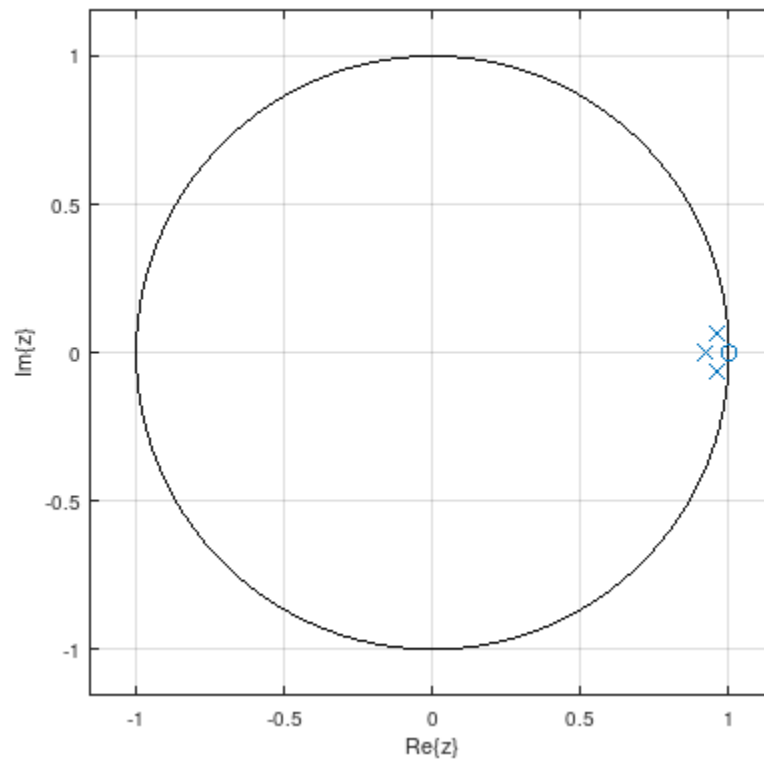
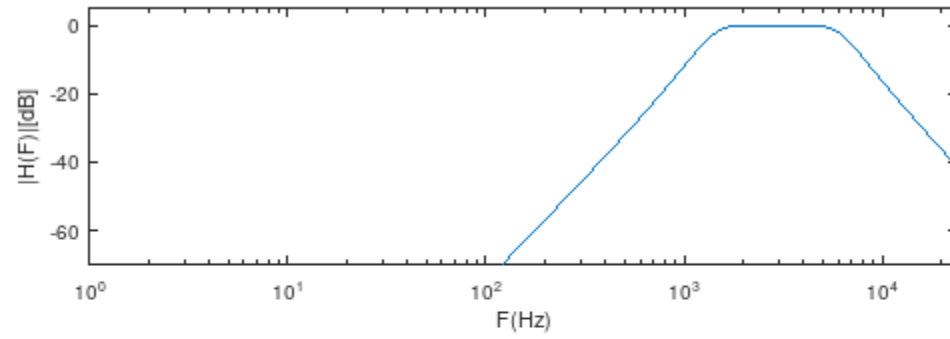


Diagrama de Polos



## Butter Bandpass

Respuesta en magnitud



Respuesta de fase

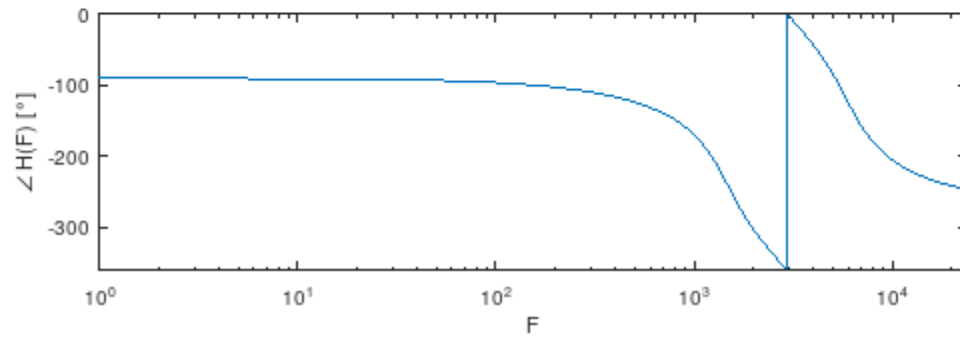
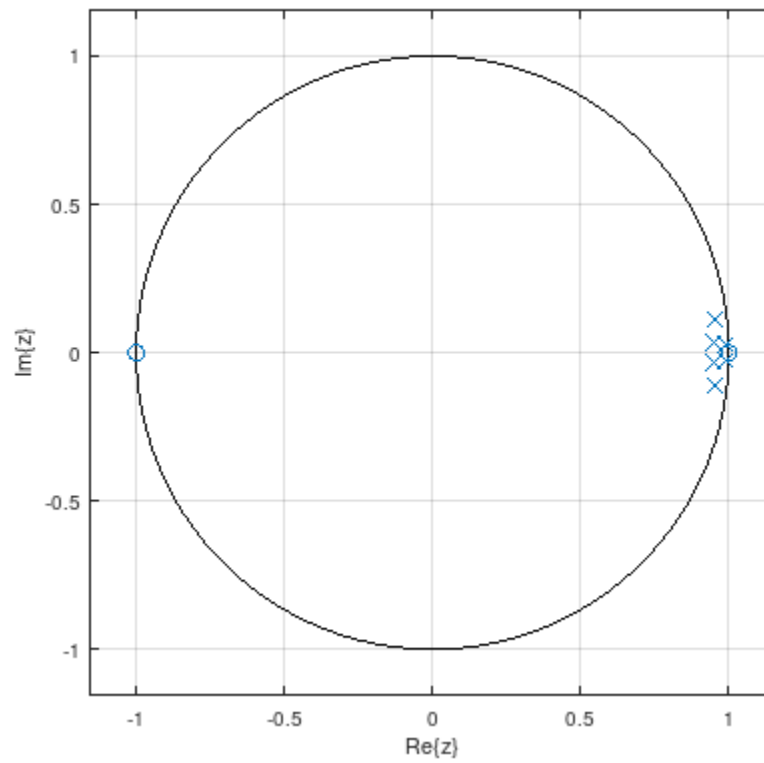
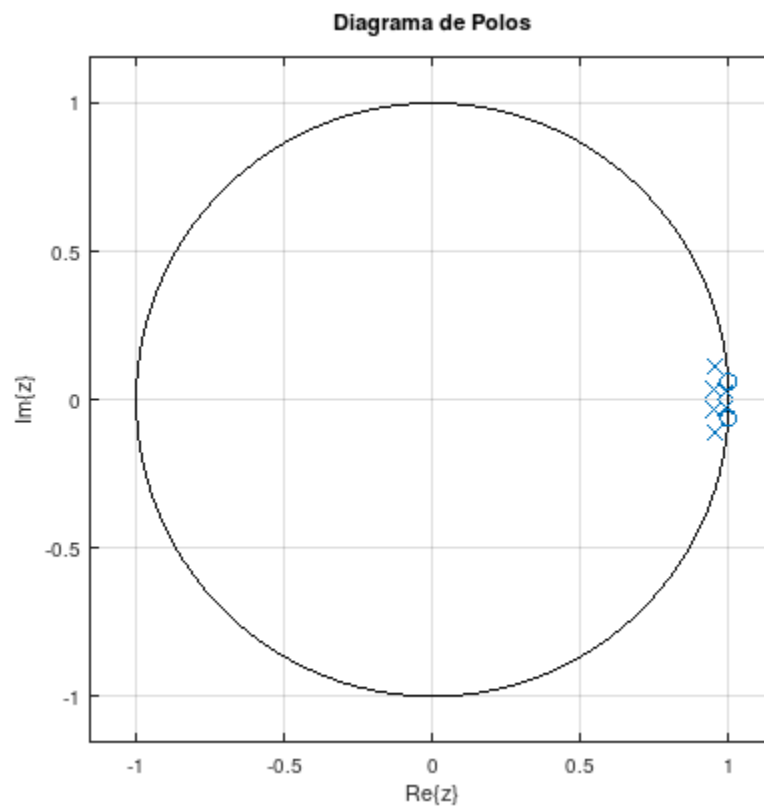
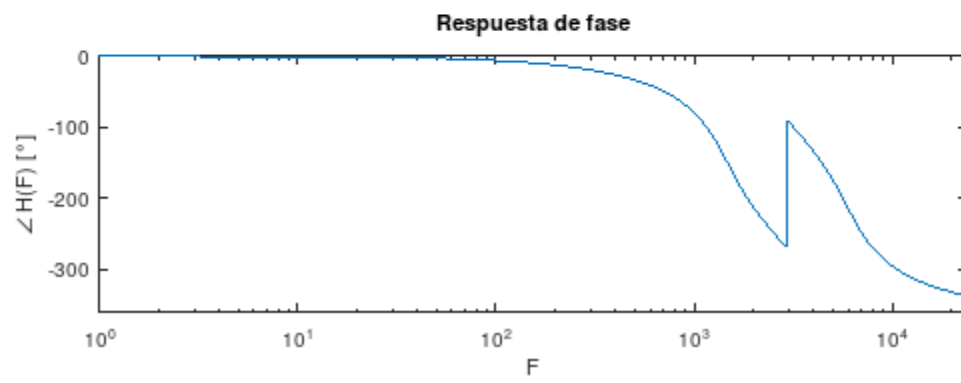
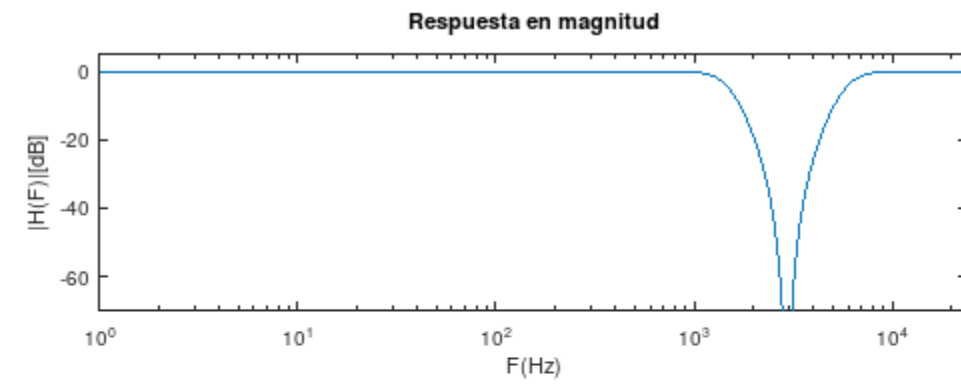


Diagrama de Polos

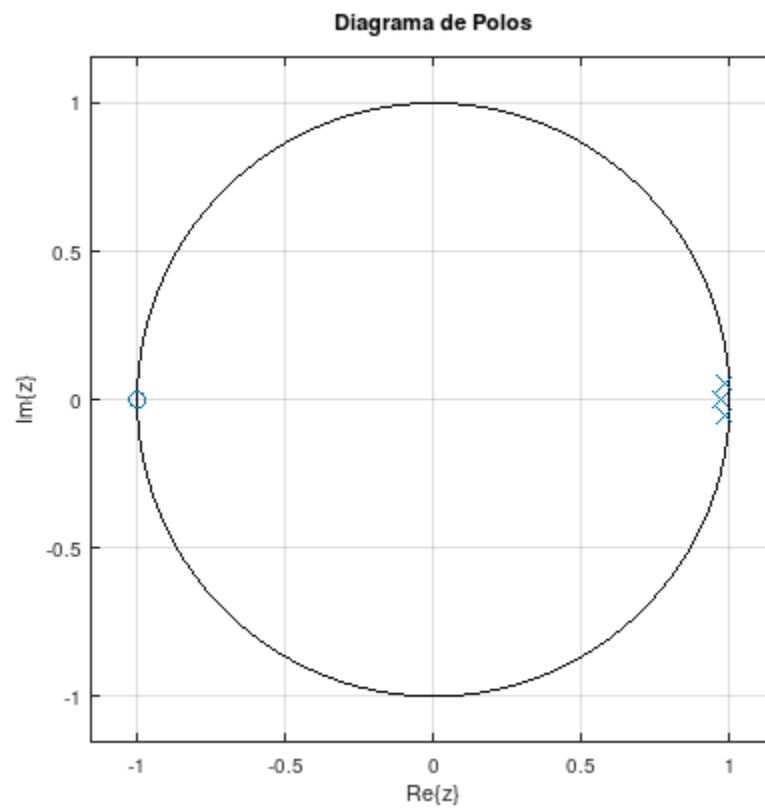
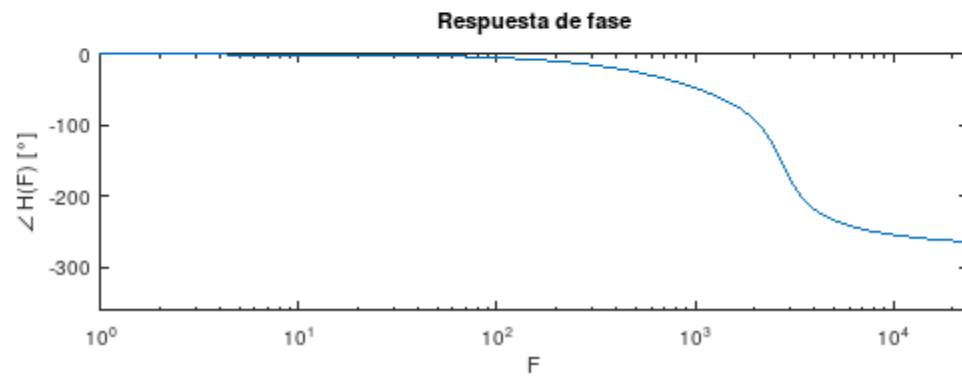
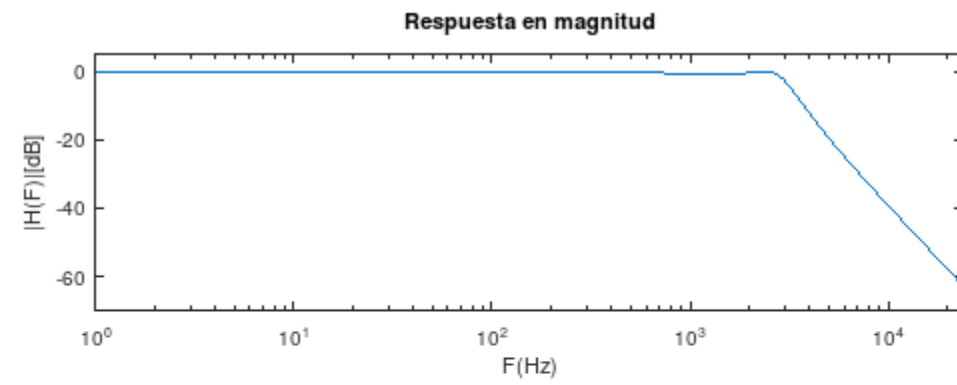




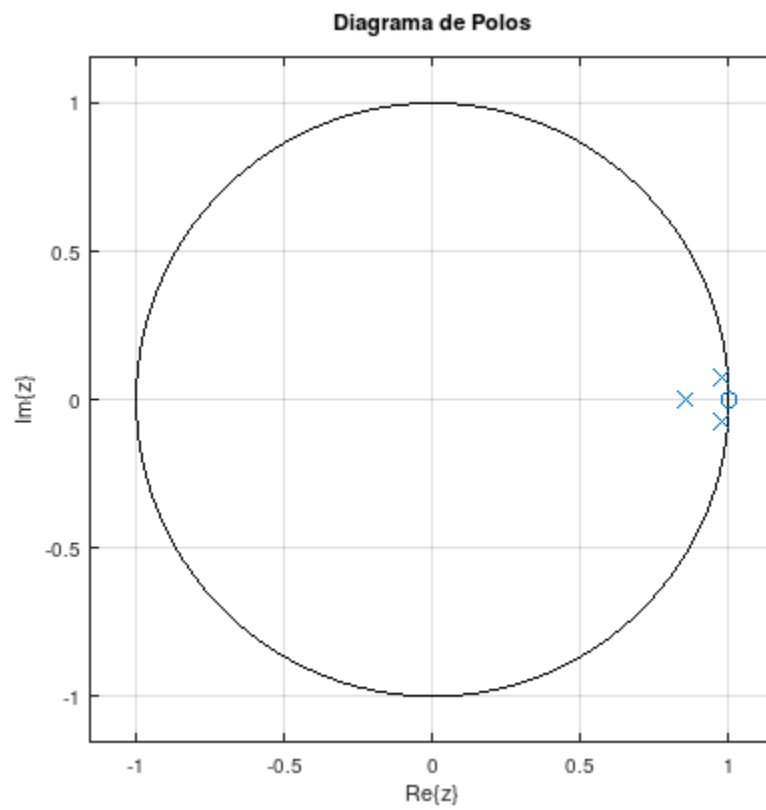
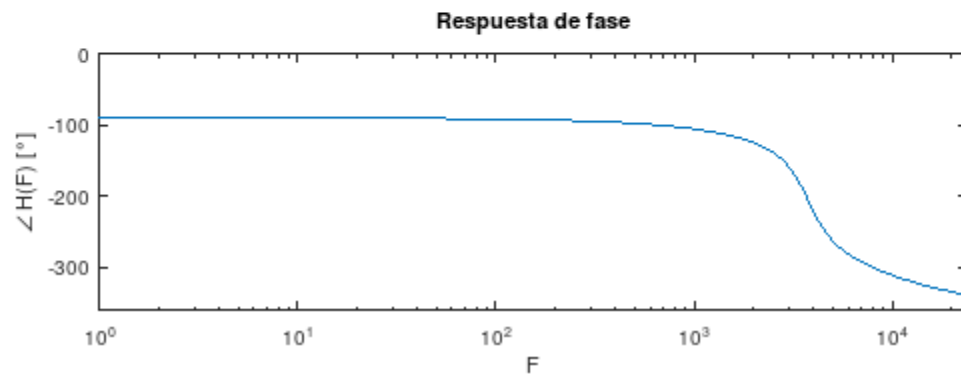
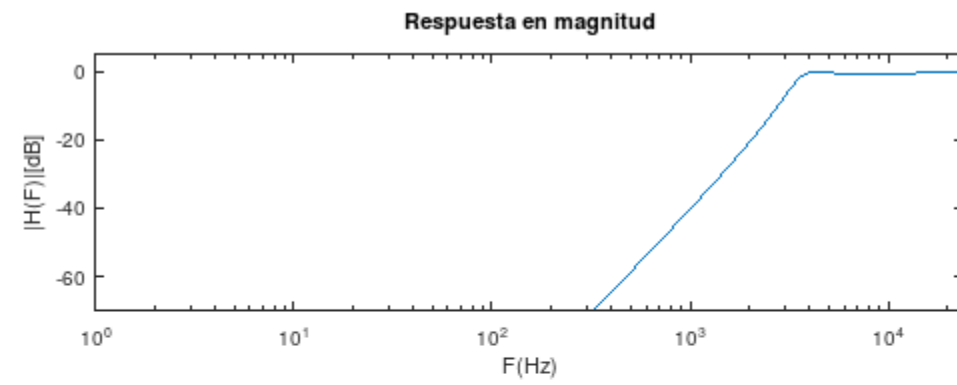
## Butter Bandstop



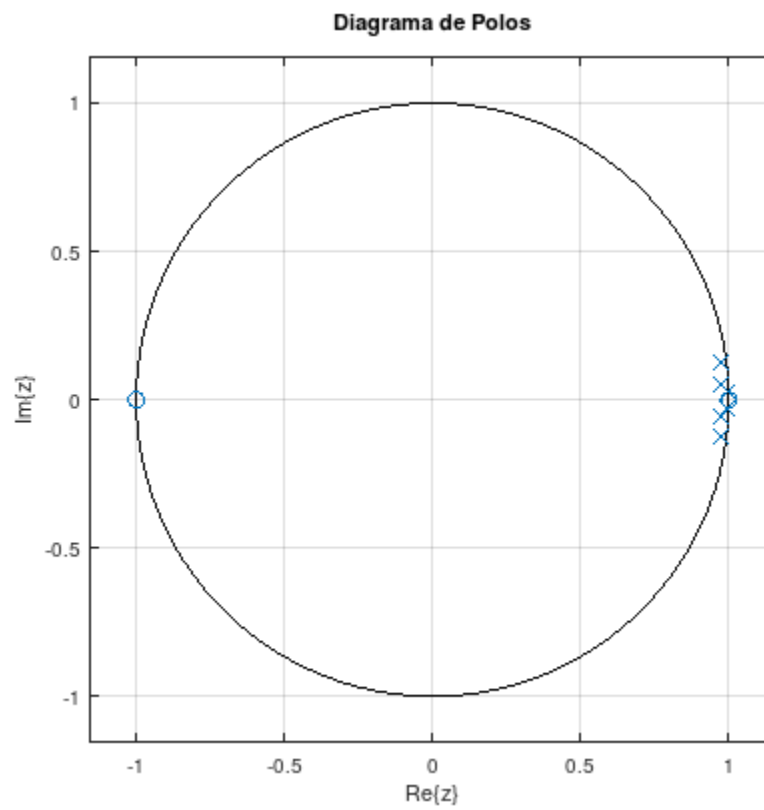
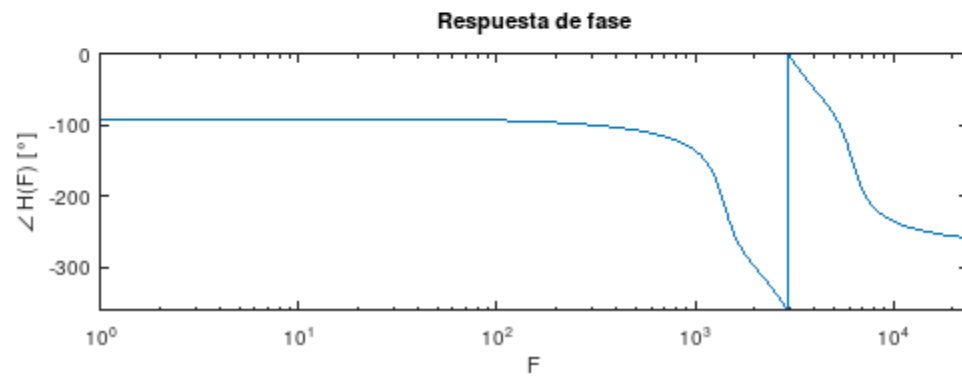
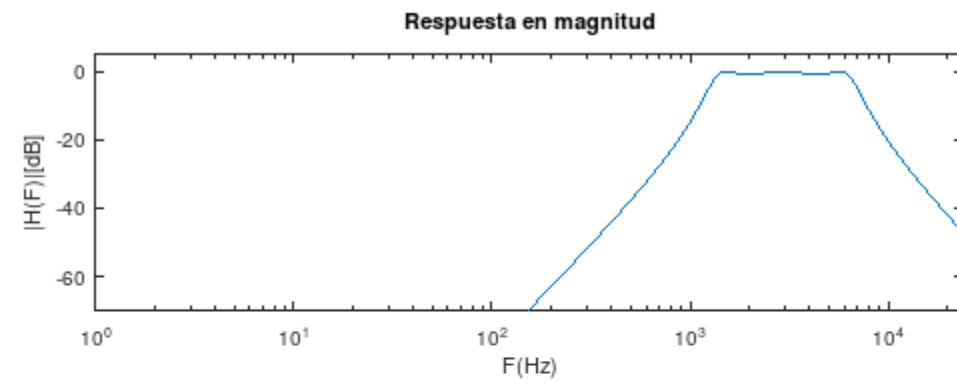
## Cheby1 Lowpass



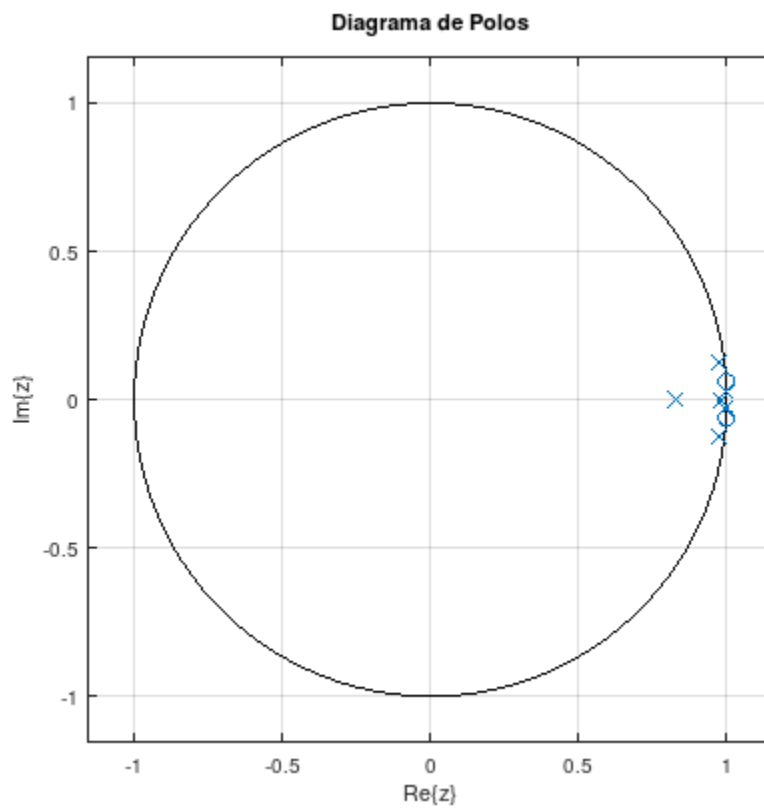
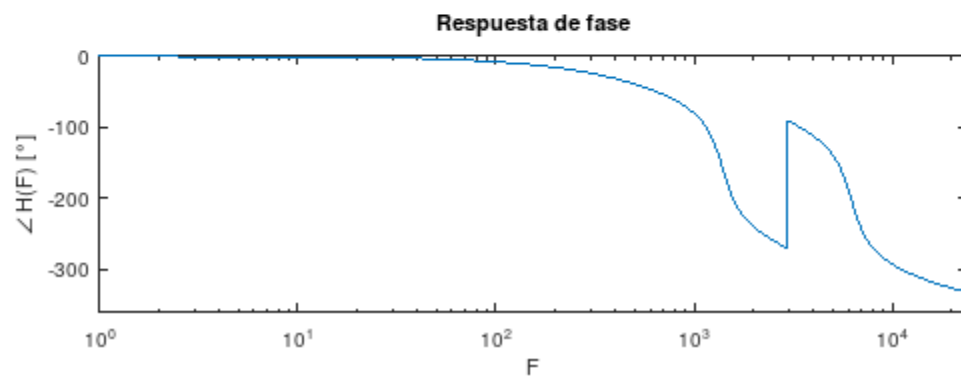
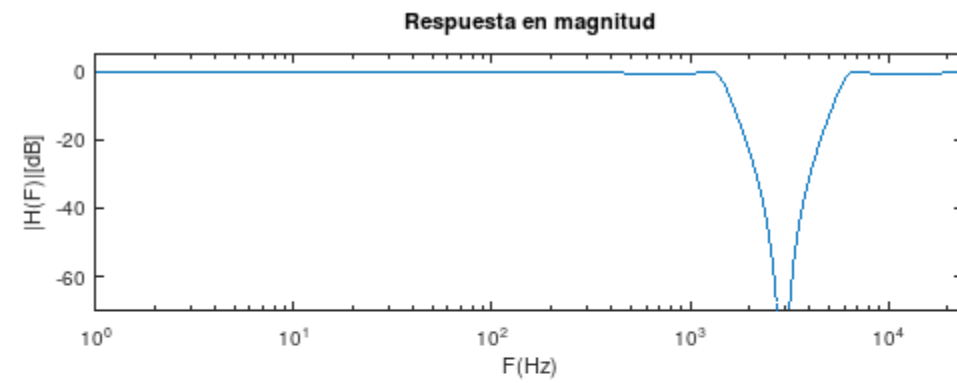
## Cheby1 Highpass



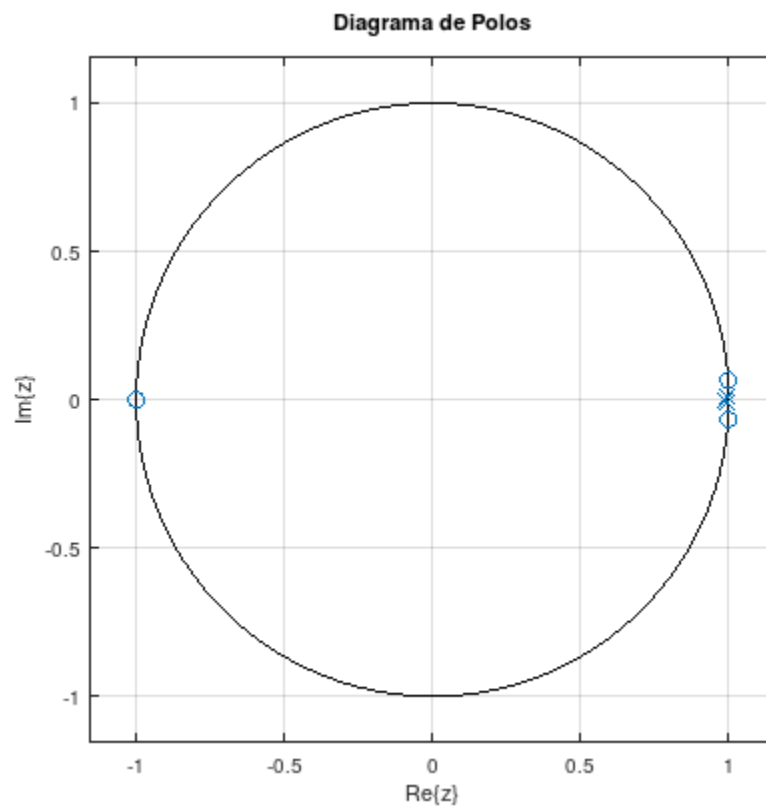
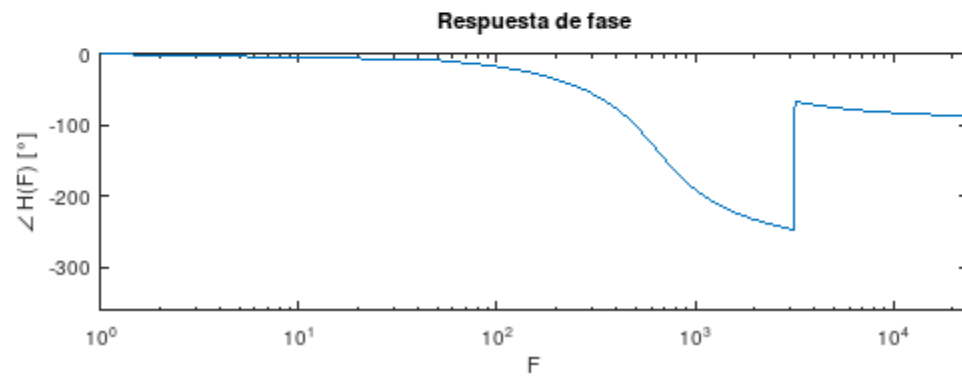
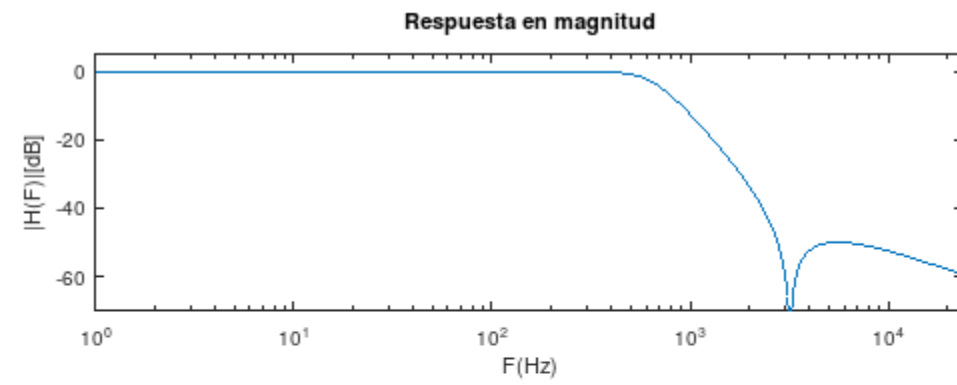
## Cheby1 Bandpass



## Cheby1 Bandstop

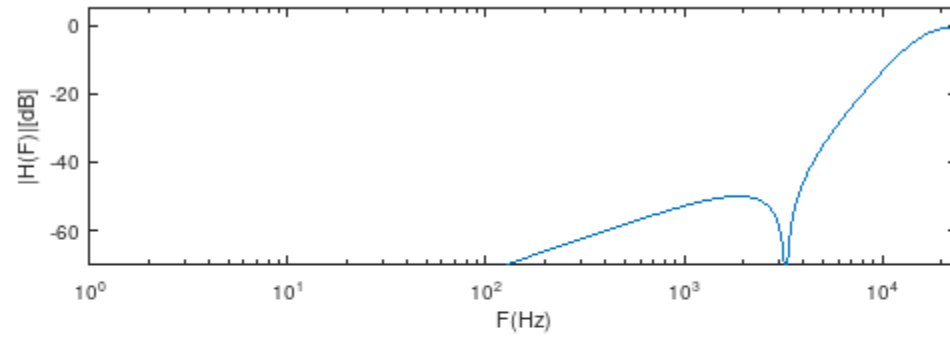


## Cheby2 Lowpass



## Cheby2 Highpass

Respuesta en magnitud



Respuesta de fase

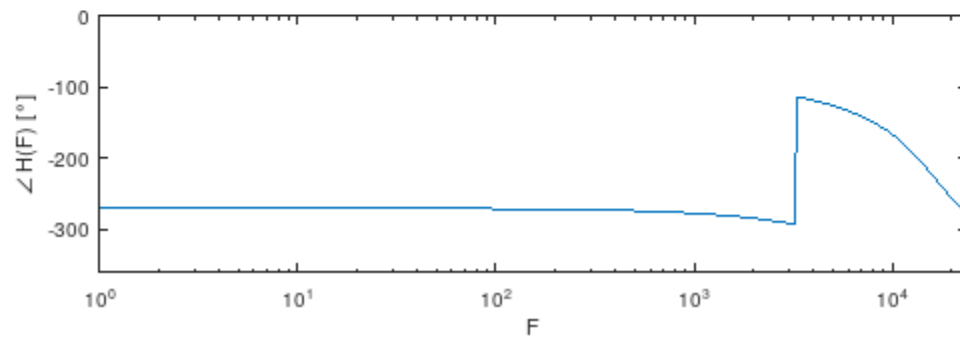
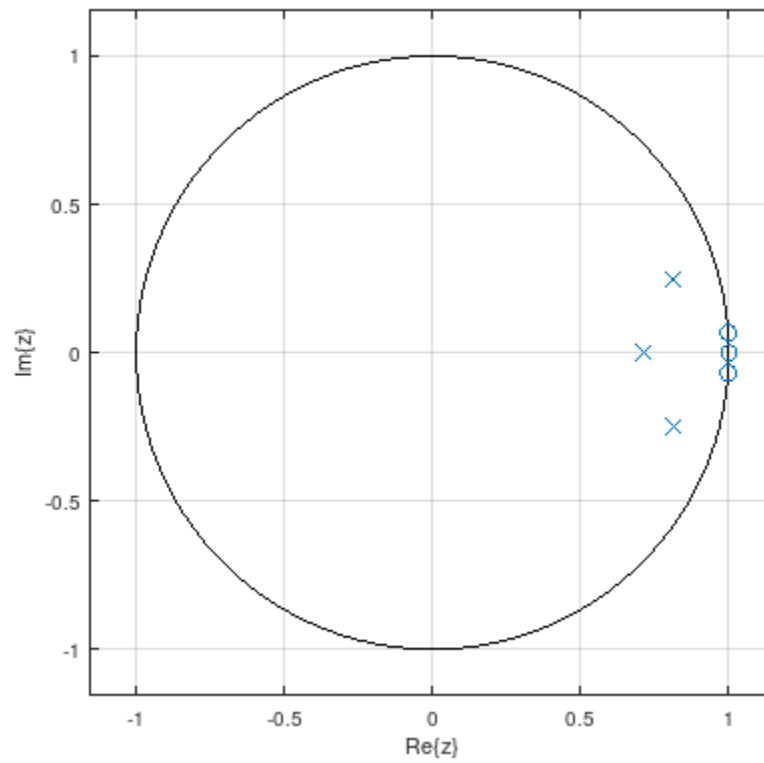
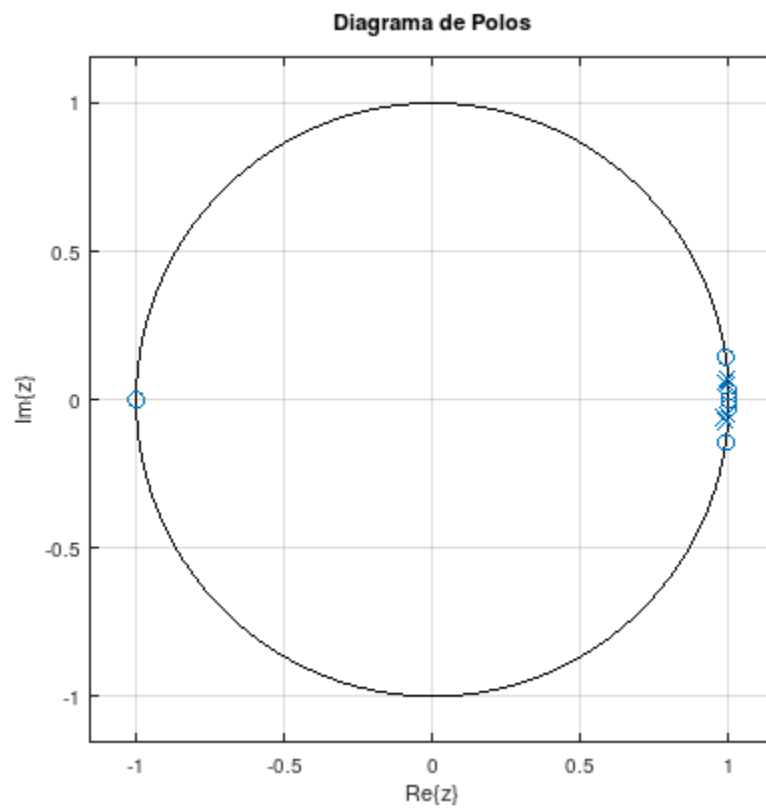
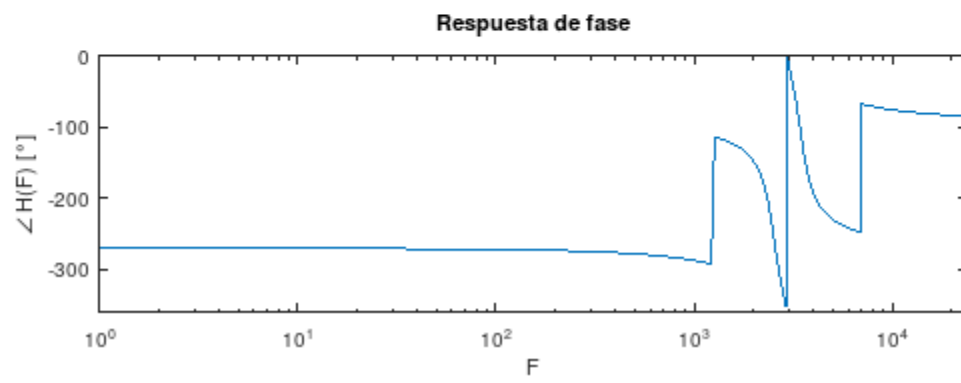
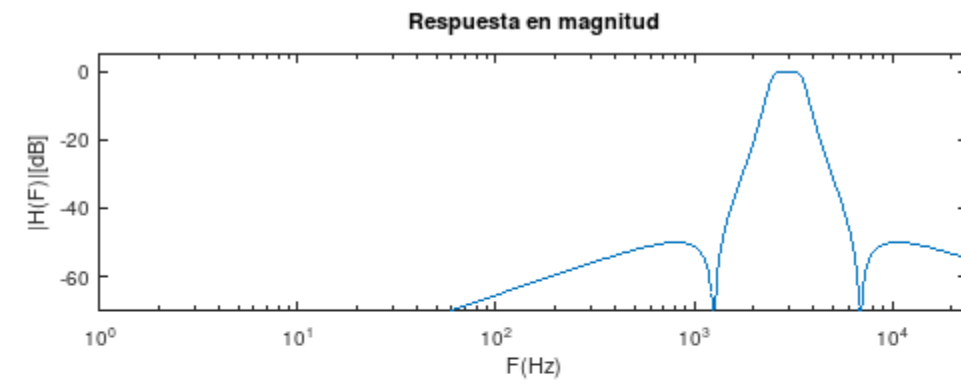


Diagrama de Polos

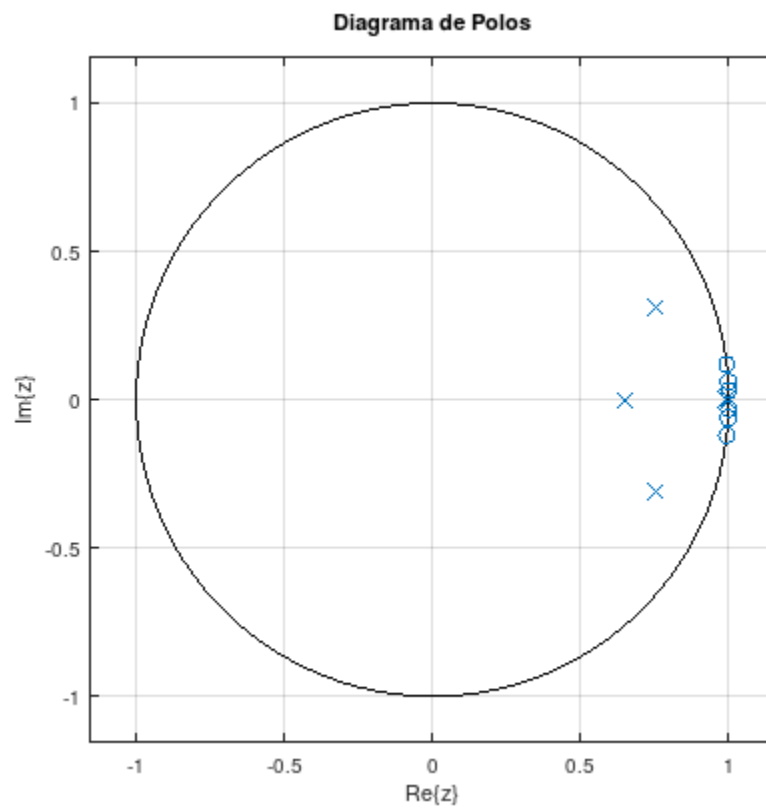
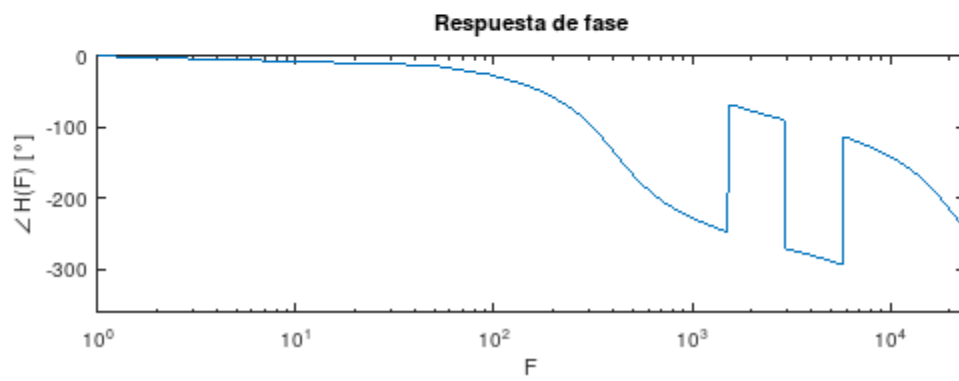
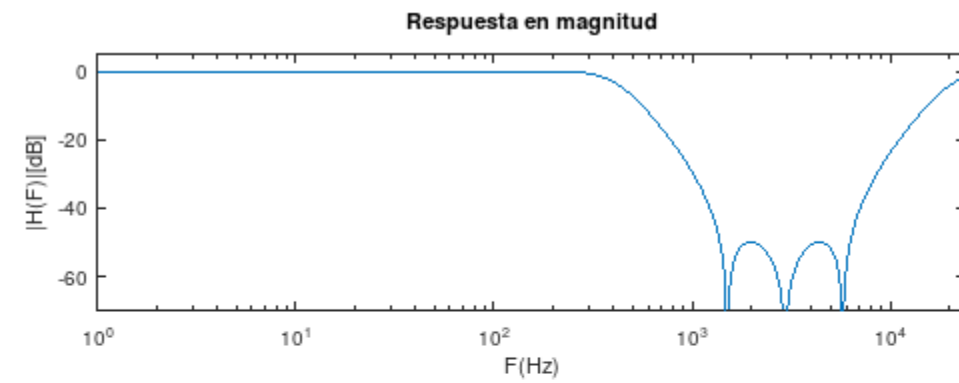


## Cheby2 Bandpass





## Cheby2 Bandstop



## Benchmark

Benchmark	Time	CPU	Iterations	UserCounters...
BM_Biquad_Process/256	1609 ns	1606 ns	435971	items_per_second=365.712/s
BM_Biquad_Process/512	3219 ns	3211 ns	217999	items_per_second=731.412/s
BM_Biquad_Process/1024	6485 ns	6447 ns	108542	items_per_second=1.46343k/s
BM_Biquad_Process/2048	12902 ns	12854 ns	54065	items_per_second=2.94694k/s
BM_Biquad_Process/4096	25750 ns	25692 ns	27249	items_per_second=5.8508k/s
BM_Biquad_Process/8192	51450 ns	51368 ns	13544	items_per_second=11.7747k/s
BM_Cascade_Process/256	1787 ns	1785 ns	391825	items_per_second=366.038/s
BM_Cascade_Process/512	3574 ns	3569 ns	193383	items_per_second=741.803/s
BM_Cascade_Process/1024	7161 ns	7149 ns	97754	items_per_second=1.4653k/s
BM_Cascade_Process/2048	14306 ns	14277 ns	49014	items_per_second=2.92658k/s
BM_Cascade_Process/4096	28625 ns	28557 ns	24511	items_per_second=5.85169k/s
BM_Cascade_Process/8192	57212 ns	57121 ns	12202	items_per_second=11.7534k/s