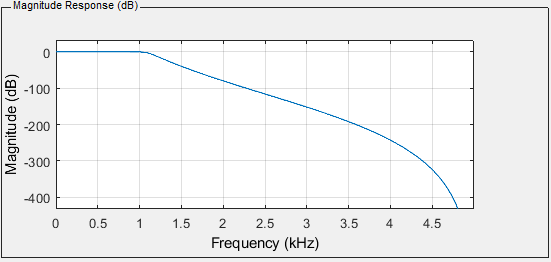
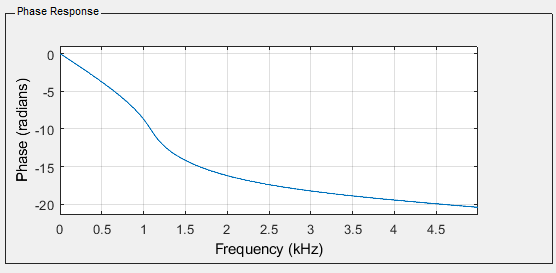
**1.1 IIR filters**

**1.**

The order of the filter is 13, the phase is what I expect for.



1. Magnitude Response



1. Phase Response

**2.**

Change the transition region to a narrow one, Fpass = 1 kHz, Fstop = 1.5kHz, the order increase to 22.

Change the transition region to a widen one, Fpass = 1 kHz, Fstop = 2.5kHz, the order decrease to 9.

When we narrow the transition region, we will get better performance in transition region, but we will increase the order of the filter which means consuming more resources. When we widen it, the order will decrease. We need to balance the performance and resource consumption at the same time.

**3.**

As the result of the calculation, the minimum order of the filter should be 1.64, we use 2.