**Fractional double term pole**

Fractional zero transfer function is given by ) = ……(17)

Put s = jω, in equation (17) results into ) = …….(18)

Magnitude in dB is given by )| dB =

- 20log **Calculation procedure**

**=**

= =

Applying De Moivre’s theorem in above equation we get

. …… (19)

Again,

= . …… (20)

Put equation (19) and (20) in (18) we get

) =

Magnitude , |) | =

=

=

Now, magnitude in dB, |) | dB

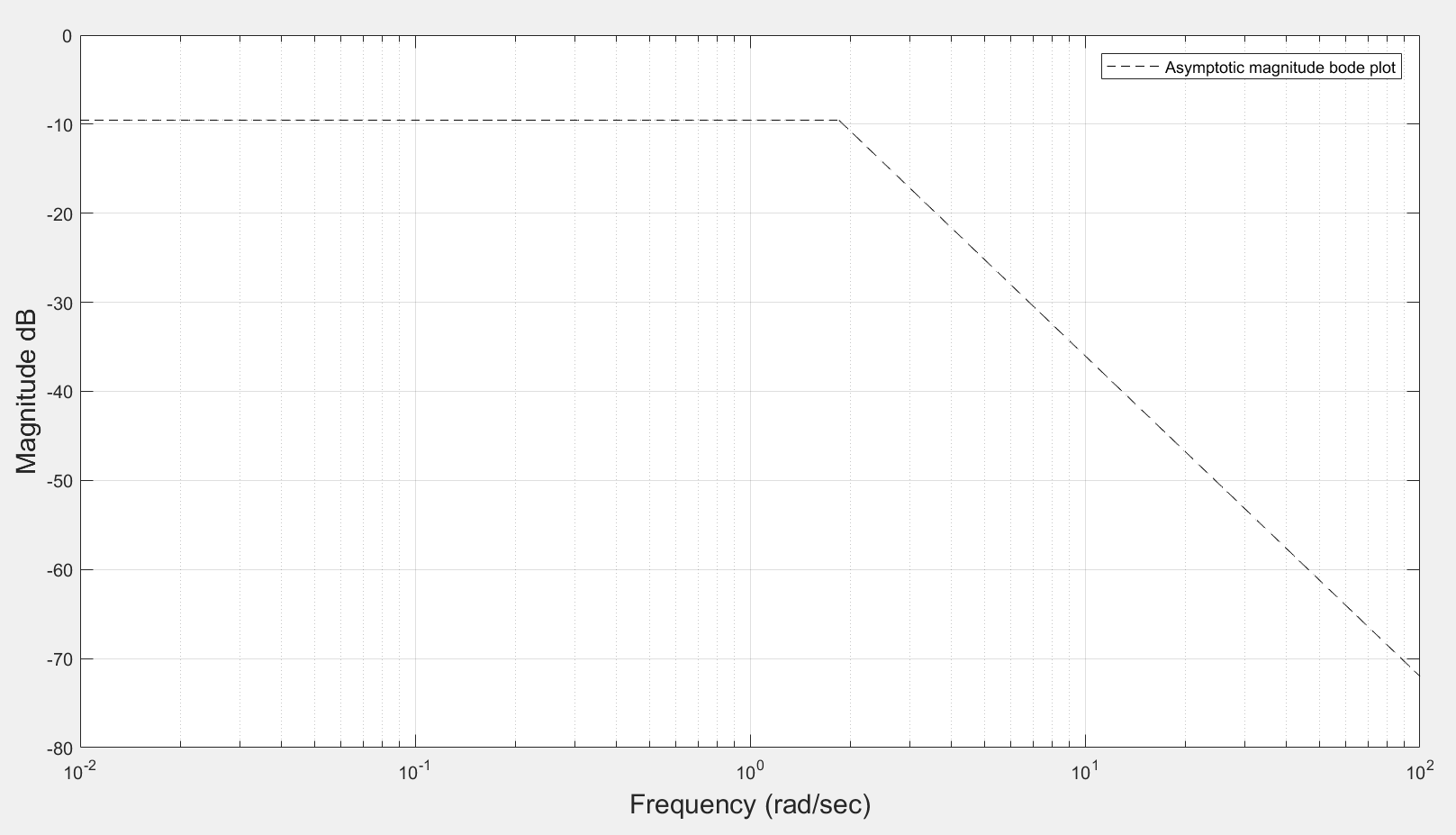
= -20log

In the sum , dominates at lower frequencies whereas dominates at higher frequencies. For approximation we consider = . Now, we obtain corner frequency, =.

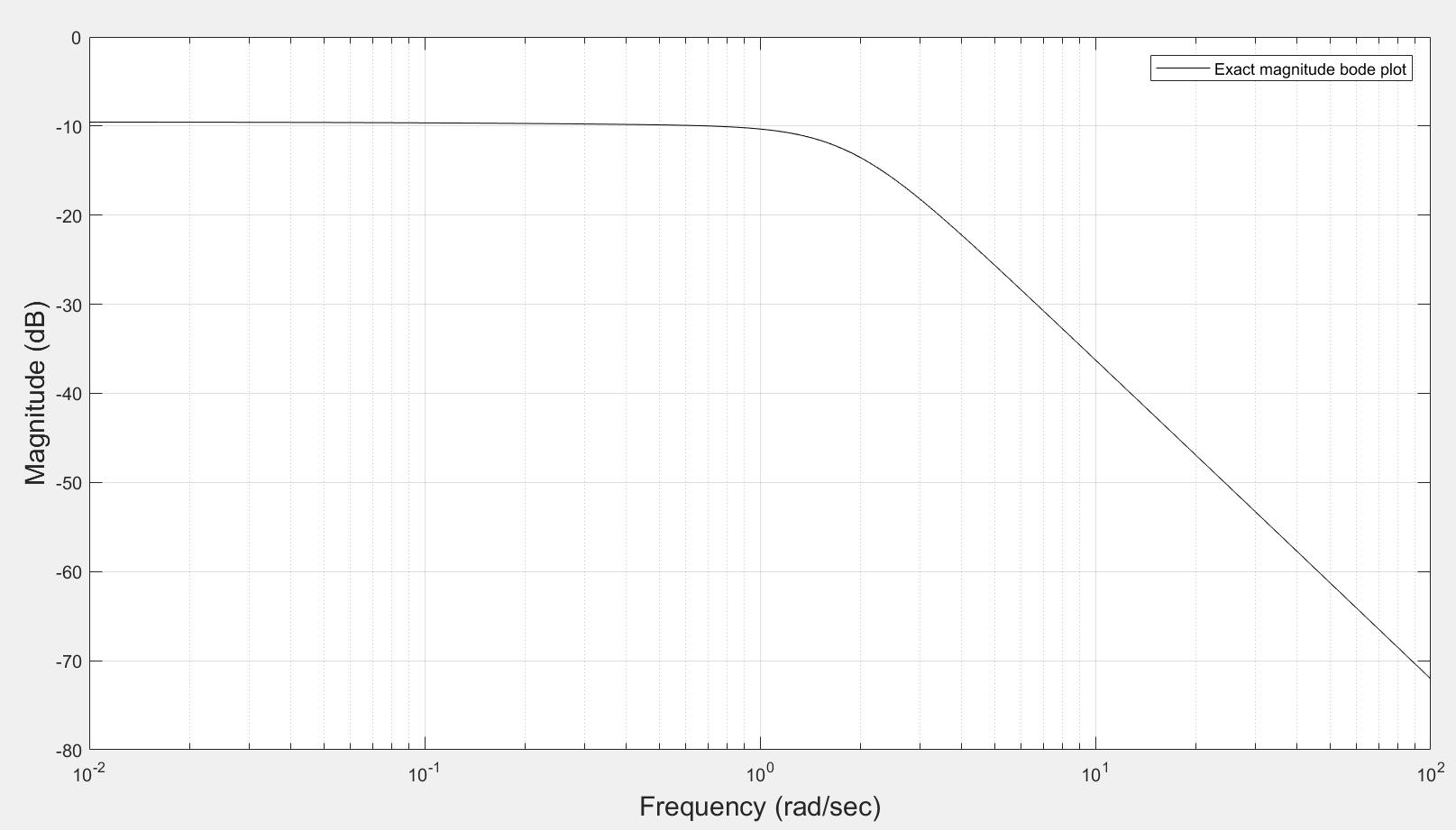
Following approximation of magnitude is obtained:

1. For ω ≤ , |)| dB = -20log||.
2. For ω >, |)| dB = -20(α+β) log ω.

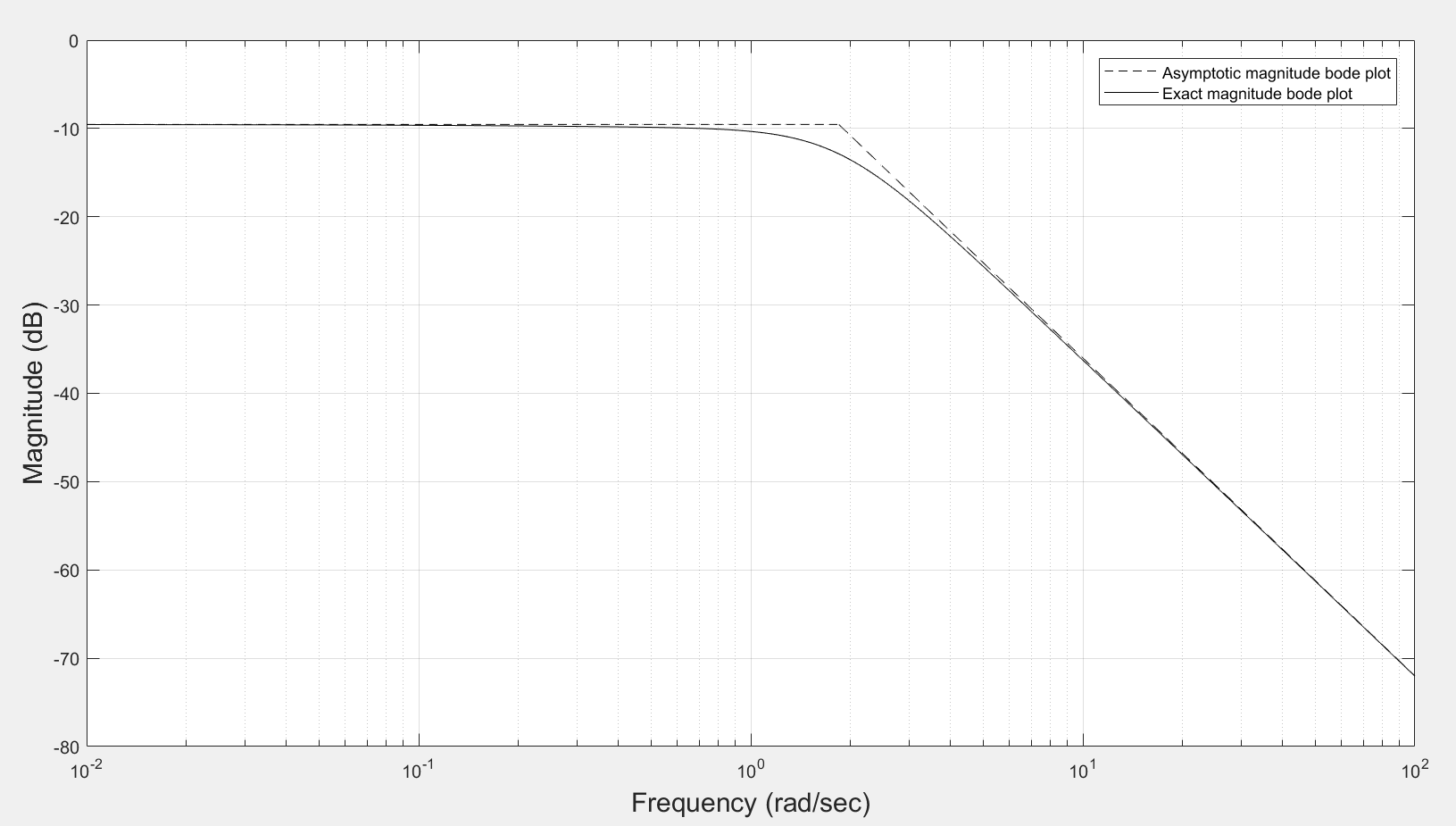
**Result:** Taking α = 0.9, β = 0.9, , 3 and 1.842.



**Figure 3.13-Asymptotic magnitude bode plot of fractional double term pole.**

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**Figure 3.14-Exact magnitude bode plot for fractional double term pole.**

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**Figure 3.15-Exact and asymptotic magnitude bode plot for fractional double term pole.**