

```
1 function [C] = design_PD(p,poles)
2 %DESIGN_PD Summary of this function goes here
3 %   Detailed explanation goes here
4
5 p_polse = pole(p);
6 [p_zeros, gain] = zero(p);
7
8 syms a
9
10 sum_of_all_phases = atan2(imag(gain), real(gain));
11 for i = 1:length(p_polse)
12     sum_of_all_phases = sum_of_all_phases - atan2(imag(poles(
13 1) - p_polse(i)), real(poles(1) - p_polse(i)));
14
15 for i = 1:length(p_zeros)
16     sum_of_all_phases = sum_of_all_phases + atan2(imag(poles(
17 1) - p_zeros(i)), real(poles(1) - p_zeros(i)));
18
19
20 a_ = real(double(solve(atan2(imag(poles(1)), real(poles(1) + a)) + sum_of_all_phases == -pi)));
21
22
23 magnitude_of_zeors = abs(poles(1) + a_);
24 for i = 1:length(p_zeros)
25     magnitude_of_zeors = magnitude_of_zeors * abs(poles(1) -
26 p_zeros(i));
27
28 magnitude_of_poles = 1;
29 for i = 1:length(p_polse)
30     magnitude_of_poles = magnitude_of_poles * abs(poles(1) -
31 p_polse(i));
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31 end
32
33 k_ = magnitude_of_poles / magnitude_of_zeors;
34
35 C = tf([k_ k_*a_],1);
36
37 end
38
39
```