```
 1 function [C] = design_PI(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
 9 sum_of_all_phases = atan2(imag(gain), real(gain)) - atan2(imag(poles(1)), real(poles(1)));
10 for i = 1:length(p_polse)
11     sum_of_all_phases = sum_of_all_phases - atan2(imag(poles(1) - p_polse(i)), real(poles(1) - p_polse(i)));
12 end
13
14 for i = 1:length(p_zeros)
15     sum_of_all_phases = sum_of_all_phases + atan2(imag(poles(1) - p_zeros(i)), real(poles(1) - p_zeros(i)));
16 end
17 % sum_of_all_phases
18 % poles(1)
19 a_ = imag(poles(1))/tan(-pi-sum_of_all_phases) - real(poles(1));
20
21
22 magnitude_of_zeors = abs(poles(1) + a_);
23 for i = 1:length(p_zeros)
24     magnitude_of_zeors = magnitude_of_zeors * abs(poles(1) - p_zeros(i));
25 end
26
27 magnitude_of_poles = abs(poles(1));
28 for i = 1:length(p_polse)
29     magnitude_of_poles = magnitude_of_poles * abs(poles(1) - p_polse(i));
```

```
30 end
31 % magnitude_of_poles
32 % magnitude_of_zeors
33
34 k_ = magnitude_of_poles / (gain*magnitude_of_zeors);
35
36 C = k_*tf([1 a_],[1 0]);
37
38 end
39
40
```