The "Funnel" of Harrell's Solution.

Below are several different initial guesses for a my Colebrook Solution, I called it a funnel. I already know the solution to this. 1/sqrt(F) is about 4. So I am showing the "path" for initial guesses of -4, -2, 0, 2, 4, 6, 8, 10 and 12. The red background shows where the results become the same to 15 decimals places. I will plot the steps 1, 2 and 3, after that the differences are just too small to graph.

			Min	Max	Decimals	Value			
	Danier - Ida No	b D							
	Reynolds Number, Re		2,500 0.0001	500,000	0	12000			
	Relative Rou	elative Rouchness Rr		0.05	8	0.03			
1	-4.00	-2.00	0.00	2.00	4.00	6.00	8.00	10.00	12.00
2	4.2768	4.2282	4.1822	4.1385	4.0969	4.0572	4.0192	3.9828	3.9479
3	4.0913	4.0922	4.0932	4.0941	4.0949	4.0957	4.0965	4.0972	4.0979
4	4.0950	4.0950	4.0950	4.0950	4.0949	4.0949	4.0949	4.0949	4.0949
5	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
6	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
7	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
8	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
9	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
10	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
11	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
12	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
13	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
14	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
15	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
16	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
17	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
18	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
19	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949
20	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949	4.0949

Plot the Funnel for results for steps 1,2 and 3. At the far left at the initial guess, from -4 to 12. By step 2, the each of results are all close to a value of four. You see the lines from step 1 to step 2 cross over each a tiny bit to the left of step 2. At step 3, those paths are converging again... too small to see. Next is a zoomed screen capture at step 2 to show how the paths are converging, This shows that even if you guess is not close, my procedure quickly takes you to the solution.



