

$h$	$f(k+h)$	$f(k-h)$	$\Delta f$	$\partial f / \partial kd(fw)$	$\partial f / \partial kd(cen)$
$10^{-1}$	19.18557758	19.20027713	-0.007416332318	-0.074163323	-0.07349775
$10^{-2}$	19.19225719	19.19372728	-0.0007367202196	-0.073672022	-0.073504422
$10^{-3}$	19.19292029	19.1930673	-7.362331482e-05	-0.073623315	-0.073505614
$10^{-4}$	19.19298655	19.19300125	-7.361801508e-06	-0.073618015	-0.073505716
$10^{-5}$	19.19299318	19.19299465	-7.361748153e-07	-0.073617482	-0.07350579
$10^{-6}$	19.19299384	19.19299399	-7.361756005e-08	-0.07361756	-0.073506207
$10^{-7}$	19.19299391	19.19299392	-7.361151688e-09	-0.073611517	-0.073504207
$10^{-8}$	19.19299391	19.19299392	-7.360547727e-10	-0.073605477	-0.073513995
$10^{-9}$	19.19299391	19.19299391	-7.328182505e-11	-0.073281825	-0.07304557
$10^{-10}$	19.19299391	19.19299391	-7.091216503e-12	-0.070912165	-0.072120088
$10^{-11}$	19.19299391	19.19299391	-6.430411759e-13	-0.064304118	-0.071409545
$10^{-12}$	19.19299391	19.19299391	5.684341886e-14	0.056843419	-0.0088817842
$10^{-13}$	19.19299391	19.19299391	8.171241461e-14	0.81712415	0.23092639
$10^{-14}$	19.19299391	19.19299391	1.776356839e-14	1.7763568	0.88817842
$10^{-15}$	19.19299391	19.19299391	0	0	0
$10^{-16}$	19.19299391	19.19299391	0	0	0
$10^{-17}$	19.19299391	19.19299391	0	0	0
$10^{-18}$	19.19299391	19.19299391	0	0	0
$10^{-19}$	19.19299391	19.19299391	0	0	0
$10^{-20}$	19.19299391	19.19299391	0	0	0
$10^{-21}$	19.19299391	19.19299391	0	0	0
$10^{-22}$	19.19299391	19.19299391	0	0	0
Exact				0.88817842	0.88817842

Table 1: Step size study for kd, gains kp-1\_ki1\_kd1