Switching from Declining Balance Depreciation to Straight-Line Depreciation

$CI_0 := 100$ Initial investment

$n := 5$ Useful life

$p := 0.3$ Declining balance rate

$t := 0, 0.5 .. n$ Time

$CI_1(t) := CI_0 \cdot (1 - p)^t$ Capital invested with declining balance depreciation

$t_{opt} := n + \frac{1}{\ln(1 - p)}$ Time for switch, minimizing capital invested

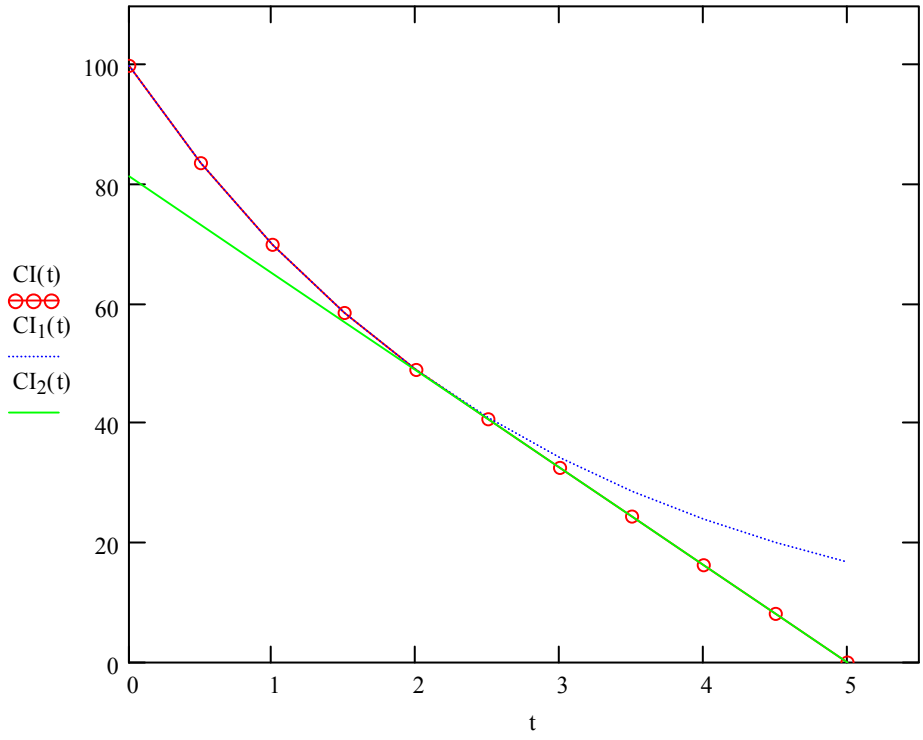
$t_{opt} = 2.196$

$CI_2(t) := \frac{CI_0 \cdot (1 - p)^{t_{opt}} \cdot (n - t)}{n - t_{opt}}$ Capital invested with straight-line depreciation

$CI(t) := wenn(t < t_{opt}, CI_1(t), CI_2(t))$ Combined function for capital invested

$CI(t) =$

100
83.666
70
58.566
49
40.738
32.59
24.443
16.295
8.148
0



$CI_a := \frac{\int_0^n CI(t)\, dt}{n}$ Average capital invested

$CI_a := \frac{CI_0}{n} \cdot \left[\frac{(1 - p)^{t_{opt}} - 1}{\ln(1 - p)} + \frac{(1 - p)^{t_{opt}} \cdot (n - t_{opt})}{2} \right]$

$CI_a = 43.265$