CMSC 460 - HW7

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$f(x)$	a	b	tol	Itter	Value
$humps(x)$	0	1	10^{-4}	93	29.8583
$humps(x)$	0	1	10^{-6}	265	29.8583
$humps(x)$	-1	2	10^{-6}	165	26.3450
$\sin(x)$	0	π	10^{-8}	121	2.0
$\cos(x)$	0	$(9/2)\pi$	10^{-6}	241	1.0
$\sqrt{x}$	0	1	10^{-8}	153	0.6667
$\sqrt{x}\log x$	eps	1	10^{-8}	205	-0.4444
$\tan(\sin x) - \sin(\tan x)$	0	π	10^{-8}	?	?
$\tan(\sin x) - \sin(\tan x)$	0	π	10^{-4}	505	2.6644
$1/(3x-1)$	0	1	10^{-4}	?	?
$x^{8/3}(1-x)^{10/3}$	0	1	10^{-8}	73	0.0074
$x^{25}(1-x)^2$	0	1	10^{-8}	49	0.0001

In general the evaluation points are concentrated at peaks and valleys of the function.

$f(x) = \tan(\sin x) - \sin(\tan x)$, $x \in [0, \pi]$ fails to converge in a reasonable time because function fluctuates wildly close to $x = \frac{\pi}{2}$ where $\tan x$ shoots to infinity.

$f(x) = 1/(3x-1)$, $x \in [0, 1]$ gets stuck and fails at $x = \frac{1}{3}$. On either side of that point $f(x)$ shoots to infinity and negative infinity. Evidentially it fails with a division by zero.

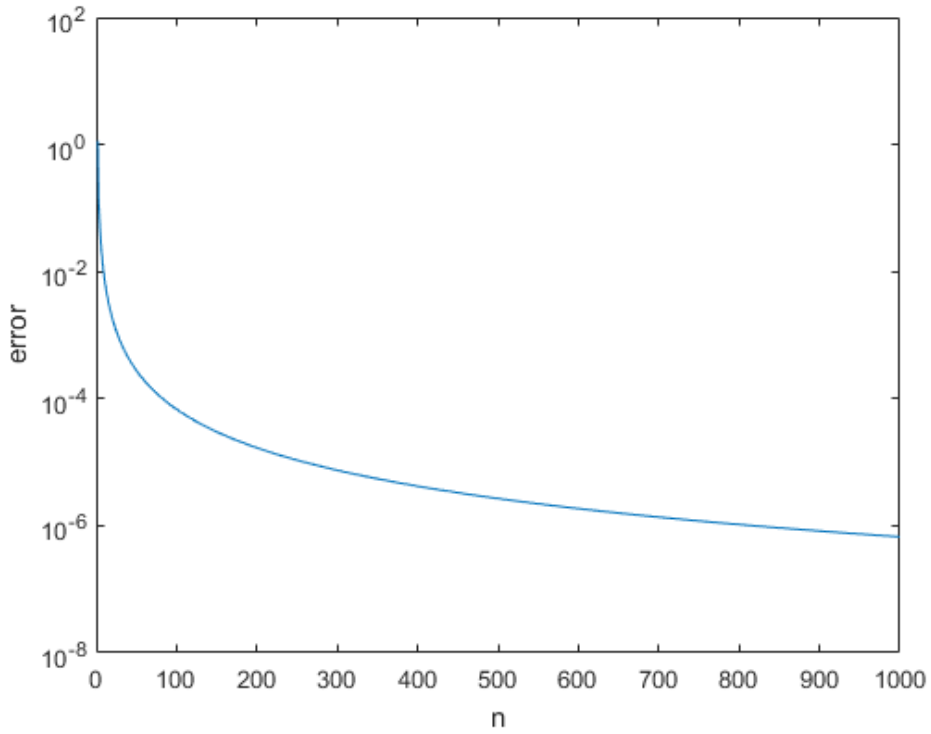

Figure 1: Error of approximating π using the composite trapezoid rule with n equally spaced points

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The error drops quickly as n increases. Figure 1 shows the error as a function of n.