PI=4*(1-1/3+1/5+etc)
ln=2.30258509log10
lnx=(x-1)/x+
((x-1)/x)^2/2 +etc
e^x=1+x+x^2/2!+etc
sinx=x-x^3/3!+x^5/5!+etc
cosx=1-x^2/2!+x^4/4!+etc
1/(x-1)=1+x+x^2+x^3+etc
Note 0! = 1! =1

(H+T)^N = sum of all n
terms Cn*H^n*T^(n-1)
Cn =N!/(n!*(N-n)!)

e^jx=cosx-jsinx
x=-b/2*a +/-
(b^2-4*a*c)^1/2/2*a

area triangle=
(s*(s-a)*(s-b)*(s-c))^1/2
where s=(a+b+c)/2

integer square
1+3=4 1+3+5=9 etc...

Permutation
N draws of M objects
P(m/n)=m!/(m-n)!
Combinations
P(m/n)=n!*C(m/n)
Means=Mx=∑ f(x)/n
Sx={(n∑x^2-∑x∑x)/n(n-1)}^1/2
Sy={(n∑y^2-∑y∑y)/n(n-1)}^1/2
Syx={(n∑xy-∑y∑x)/n(n-1)}^1/2
Covariance=
Sxy=(n∑xy-∑y∑x)/n(n-1)
Corelation R= Sxy^2/(Sy*Sx)

NORMAL DISTR ***ƒ*(x)=**
{1/sd√2∏} exp^(-(x-µ/2sd)^2)
Q(x) =∫ ƒ(x)Δx for 0<x<∞
Q(x)=ƒ(x)*(b1*t+b2*t^2+etc)
t=1/(1+r*x)
r=0.2316419
b1=0.31938153
b2=-0.356563782
b3=1.781477937
b4=-1.821255978
b5=1.330274429
INVERSE given area find x
x=t-fc(t)/fd(t)
c0=2.515517
c1=0.802853
c2=0010328
d0=1
d1=1.532788
d2=0.1892269
d3=0.001308

CURVE FIT
fy(t)=b*fx(t)+a
b=(n∑fxfy-∑x∑y)/(n∑(fx)^2-(∑fx)^2)
a=∑fy/n-b*∑fx/n
r^2=SDxy^2/(SDx*SDy)
SDxy^2=(∑fxfy-∑fx∑fy/n)^2
SDx=∑(fx^2)-(∑fx)^2/n
SDY=∑(fy^2)-(∑fy)^2/n
coeffcient of determination=
a probablity term=
b*(Mxy-MxMy)/(MSy-My^2)
1) y= bx +a fy= y fx= x
2) y= A*exp^bx
lny= lnA +bx
fy=lny fx=x a= lnA
3) y= a +b*lnx
fy= y fx= lnx
4) y= a*x^b
lny = b*lnx +lnA

POWERPOLY FIT
y=b0 +b1x +b2x^2+etc
for n terms/n equations
∑y=nb0+b1∑x+b2∑X^2+etc
∑yx=b0∑x+b1∑x^2
+b2∑x^3 +etc
∑yx^m=b0∑x^m+b1∑x^(m+1)
+b2∑x^(m+2) +etc
use Cramer to solve for b terms

ECLIPSE
x^2/a^2+y^2/b^2=1
Foci=ae
e={(a^2-b^2)/a}^1/2

SPHERE
S =4*PI*R^2
V = (4*PI*R^3)/3

PARABOLA
x^2=4yp
p=foci

HYPERBOLA
x^2/a^2-y^2/b^2=1

MORSE CODE

Later Code	Letter Code	b
A .-	Q --.-	1 .---
B -...	R .-.	2 ..--
C -.-.	S ...	3 ...-
D -..	T	4 ....
E .	U ..-	5 .....
F ..-.	V ...-	6 -....
G --.	W .--	7 --...
H	X -..-	8 ---..
I ..	Y -.--	9 ----.
J .---	Z --..	0 ----
K -.-	Error	. .-.-.-
L .-..	wait .-...	: --..--
M --	End Msg - -...	;
N -.	EndWrk ...-.-	
0 ---	InvXmit-.p	(-.--.-
P .--.	/ -..-.	

Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char
00	00	NUL	20	32	space	40	64	@	60	96	`
01	01	SOH	21	33	!	41	65	A	61	97	a
02	02	STX	22	34	"	42	66	B	62	98	b
03	03	ETX	23	35	#	43	67	C	63	99	c
04	04	EOT	24	36	$	44	68	D	64	100	d
05	05	ENQ	25	37	%	45	69	E	65	101	e
06	06	ACK	26	38	&	46	70	F	66	102	f
07	07	EEL	27	39	'	47	71	G	67	103	g
08	08	BS	28	40	)	48	72	H	68	104	h
09	09	HT	29	41	(	49	73	I	69	105	i
GA	10	L	2A	42	*	4A	74	J	6A	106	j
OB	11	VT	2B	43	+	4B	75	K	6B	107	k
GC	12	FF	2C	44	,	4C	76	L	6C	108	I
OD	13	CR	2D	45	-	4D	77	M	60	109	m
GE	14	SO	2E	46	.	4E	78	N	6E	110	n
OF	15	SI	2F	47	/	4F	79	O	6F	111	o
10	16	DLE	30	48	0	50	80	P	70	112	p
11	17	DC1	31	49	1	51	81	Q	71	113	q
12	18	DC2	32	50	2	52	82	R	72	114	r
13	19	DC3	33	51	3	53	83	S	73	115	s
14	20	DC4	34	52	4	54	84	T	74	116	t
15	21	NAK	35	53	5	55	85	U	75	117	u
16	22	SYN	36	54	6	56	86	V	76	118	v
17	23	ETB	37	55	7	57	87	W	77	119	w
18	24	CAN	38	56	8	58	88	X	78	120	x
19	25	EM	39	57	9	59	89	Y	79	121	y
1A	26	SUB	3A	58	:	5A	90	Z	7A	122	z
1E	27	ESC	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	|
1D	29	GS	3D	61	=	5D	93	]	70	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	DE

NUL	Null	DLE	Data Link Escape
SOH	Startof Heading	DC1	Device Control 1
STX	Start of Text	DC2	Device Control 2
ETX	End of Text	DC3	Device Control 3
EOT	End of Transmission	DC4	Device Control 4
ENQ	Enquiry	EM	End of Medium
ACK	Acknowledge	SUB	Substitute
BEL	Bell	ESC	Escape
BS	BackSpace	FS	File Separator
HT	Horizontal Tab	GS	Group Separator
LF	Line Feed	RS	Recorder Separator
VT	Vertical Tab	US	Unit Separator
FF	Form Feed	DEL	Delete
CR	Carriage Return		
SO	Shift Out		
SI	Shift In		
NAK	Negative Acknowledge		
SYN	Synchronous Idle		
ETB	End of Transmission Block		
CAN	Cancel		

----------Switch_Cap_equations----------------

```
   ___       ___
 _|   |     |   |__     ___   ___/\  ___
  |___| \   |___|       ___       \/
         \
         _|_
         ___
          |                 R_eq = 1/(freq_clock*C)
         _|_
         \\\\
```

If you assume the switches have a On resistance of Ron, the maximum bandwith of the RC should be..

BW = 1/(2*PI*Ron*C)

Since this is a much higher frequency than the clock, the thermal noise due to Ron should be aliased back to base frequency by this amount.

Alias_numb = [1/(2*PI*Ron*C)]/[freq_clock]

Total_alias_noise_Power_1 = 4*K*T*Ron*d_freq*Alias_numb

Since this switching happen twice the Ron should ad the same amount of noise each swithc time. The new total should now be.

= 4*K*T*Ron*d_freq*(1/PI*Ron)*(1/(freq_clock*C))

Total_alias_noise_Power = 4*K*T*d_freq*(1/PI)*(R_eq)

This says that this noise voltage should be about 4dB below what it should be if R_eq where a simple resistor.

Given that the real noise contained in a single pole lowpass filtered has really 2.46 dB more noise than is defined by the 3dB bandwidth, the switch on resistance noise which is alias to the base band frequency is becoming much closer.