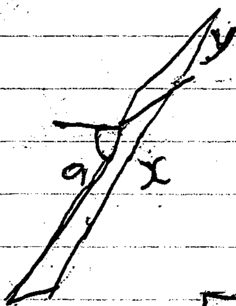
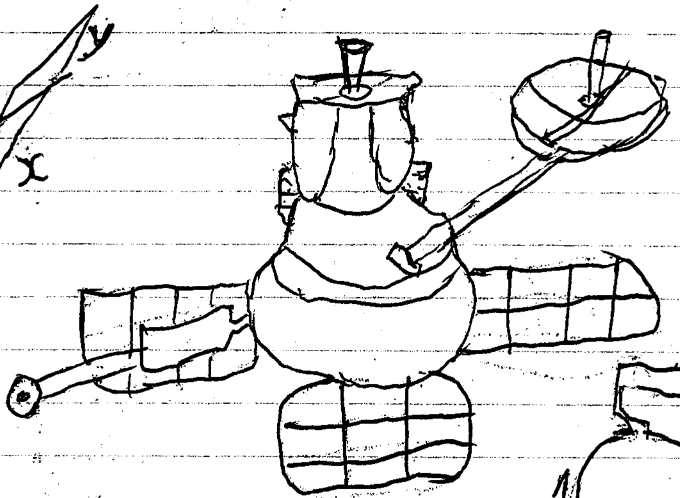
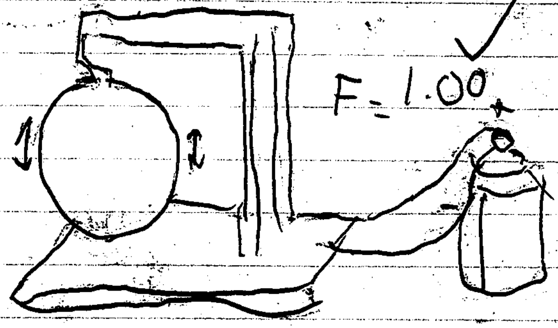
Axial Plane



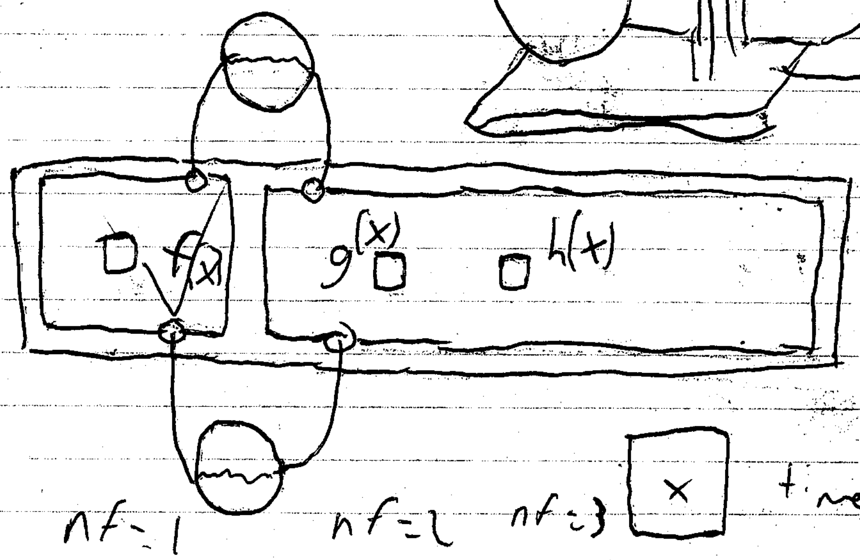



$x = 500$

$F = 1.00$



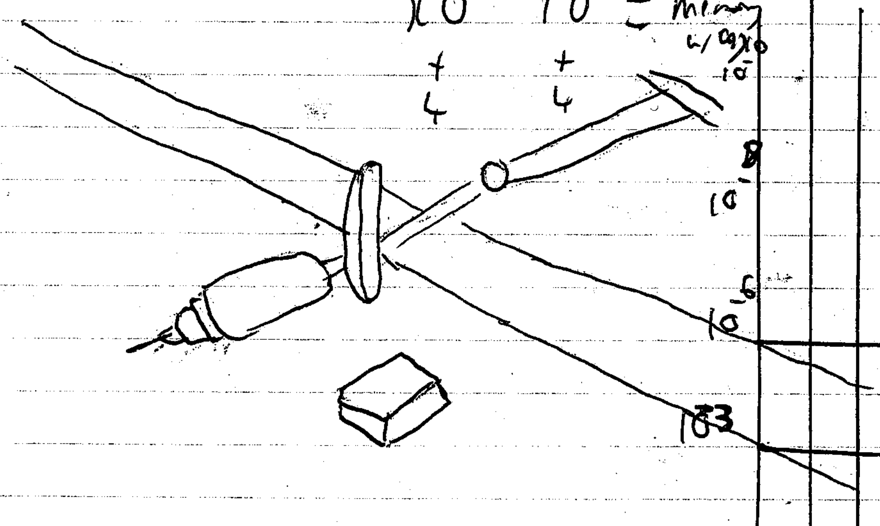
$x_{pi}, y_{pi}$

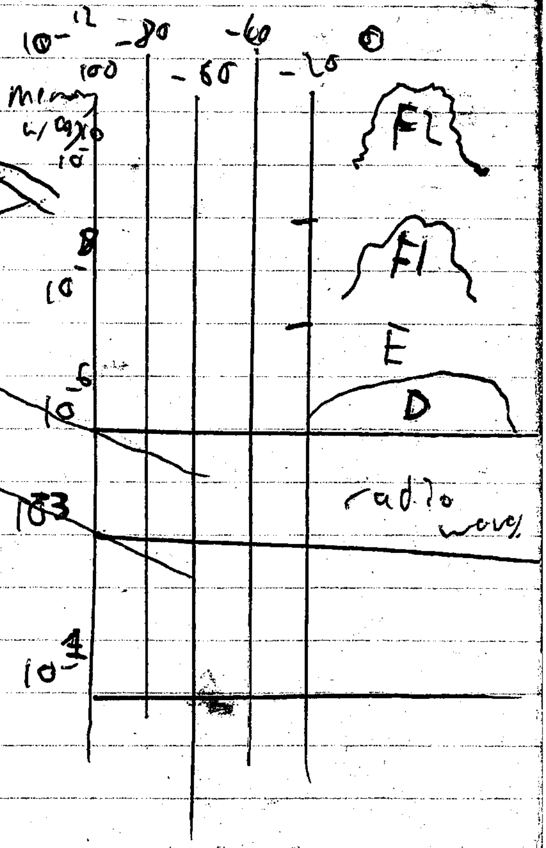



nf=1 nf=2 nf=3 time

cube sat.

$x_0 \pm 4$ $f_0 \pm 4$ = mean w/ a x0





The measurement through photographs of reflected light from the surface. This gives a very accurate indication of slope.

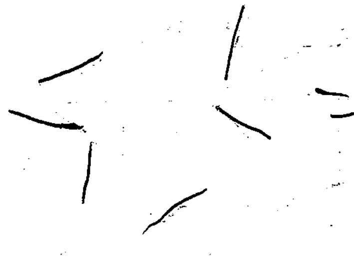
$$Y = \frac{a}{x} \qquad \frac{a^m}{a^n} = a^{m-n}$$

First the photographic image is scanned to determine the density of photographic emulsion & from this measurement the surface brightness is obtained. This brightness measurement is then related to the Axial Pane, positioned and orientation on the photograph would have a unique light - scattering value which could be expressed in terms of the sun - angle & the nadir & orientation of the camera. Since these are all known factors we can say theoretically just point & certain value equal the reflectivity should be for that point & any other point + variation from hmz - mhz

+ Kenite -

Ground = light = surface

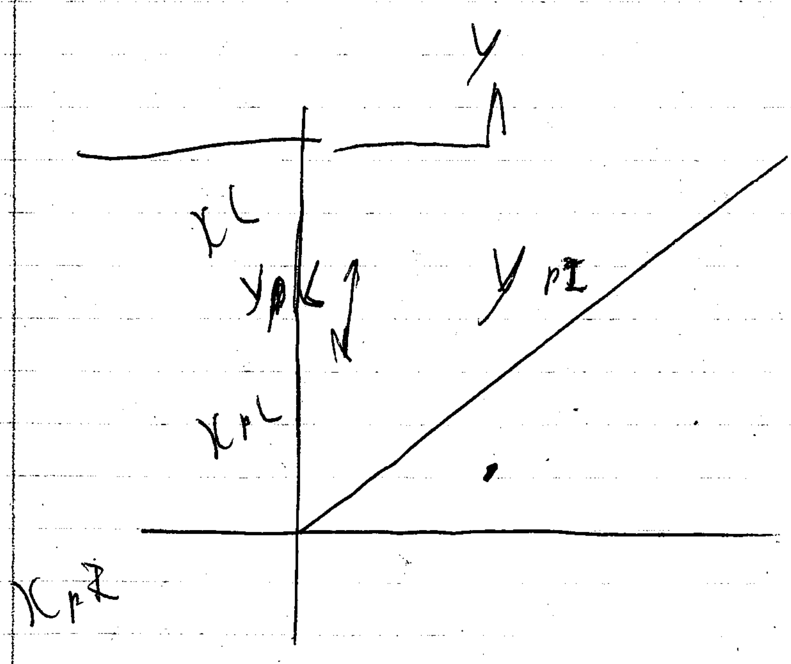
{default - brush "circle" 4}

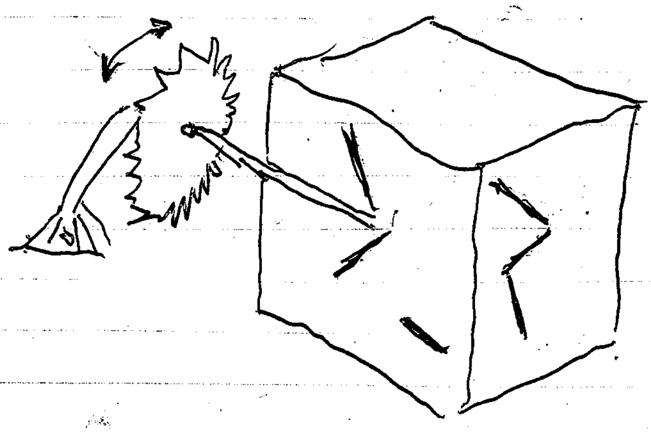


= 6 = 0.1 .5

# Nonlinear Equations

The Function $f(x)$ may be given explicitly as, for example, a polynomial in $x$ or as a transcendental function. Frequently, however, $f(x)$ may be known only implicitly; ie rule for evaluating $f(x)$ for any argument may be known but its explicit form is unknown. Thus $f(x)$ may represent the value which solution of a differential equation assumes at a specified point, while $x$ may represent an initial condition equation assume at a graph



Viz

30/3/12

Now it has been imaged that this irreversible machine this heagonal wheel can only turn one way.

Now it has been imagin that this irreversible machine this wheel that can only turn ~~one~~ way, could be used for a very useful and interesting thing. As you know, there is a perpetual irregular motion of molecules, and if you build a very delicate instrument it will always be irreversible or reversible depend on processes which occur in reverse in any matter or final state or relation between the quantities connected with the initial or final states of wave process, state of irreversible process is evidently in some way discriminate from state to state are certain marked equivalent point all the characteristic probably of both sides & also shows have two states are given, whether a transformation is possible in nature from the 1st to the second, or second to 1st which leaving change the states must be fully characterised

In question the physical consideration of both state & waveform

The universe is also studied by radio, infrared, Ultra violet, x-ray & gamma-rays

The recordings made by individual radiation detectors can then be processed as required to give pictures in arbitrary colours expressing for

A radio picture of the Nucleus of the Galaxy at a wavelength $\lambda = 3.75$cm At two given points of observation two opposite points on the Earth orbit around the sun. Besides light, the Earth's atmosphere allows only parts of the range of infrared & radio radiation to reach ground or sea level frequency. (0.0m) - 1.4m.

If we regard the second law from the mathematical point of view the distinction between the final & initial states of a process can consist only inequally. This means that a certain quantity which depends on the momentary state of the system passes from state to state in - & + values according to the destination of the sign of that in the initial state

When they are used as pair of formulas, the open type formula is also called a predictor while the closed type formula is called a corrector. A corrector formula is generally more accurate than a predictor formula, because the coefficient in the error is (−) smaller.

this will depend on many factors, However if the predictor & corrector formulas are of the same order 1, 2, appplies. of the corrector & +− depending on the sizes

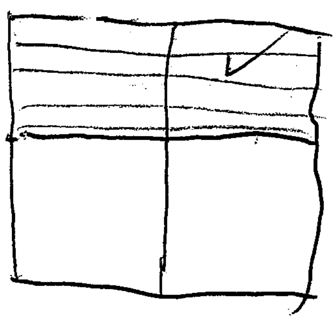
$$\cancel{y'}\ \frac{x}{y} + \frac{y}{x} - y \qquad y(1) = 0.5 \quad (0) = 1.0$$

A Pointer is simply the address of a memory object x + y such as a variable with pointers We can indirectly or directly access these objects

$$\frac{a^m}{a^n} = \begin{cases} m > n \ \updownarrow \ x \\ \text{location} \\ \\ m < n \ \updownarrow \ y \\ \text{location} \end{cases}$$

Amounts

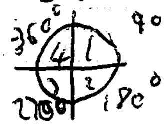
rates



frame Pedrow'

The off-flexion in different variables such as a gound or position + nosition function

for instance if a global variable of earth has sets of 4 data variables




These variables are called arbitrary or frames. Which region of contiguous memory locations that contain memory arrays of that function

circumference of an area?

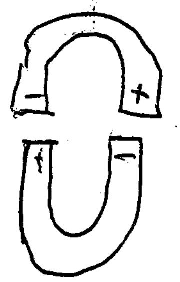
$$\int \frac{x^4}{\sqrt{a^2 - x^2}} \, dx$$

$b^n = a$ then $b = \sqrt[n]{a}$

If n is odd there will be a unique real number N satisfy the above definition for $\sqrt[n]{a}$ for any real of a) light speed if n is is even for positive values of a there will be two real values for $\sqrt[n]{a}$ one positive & a negative

[ 1 ~

Then it relates to electrified matter.

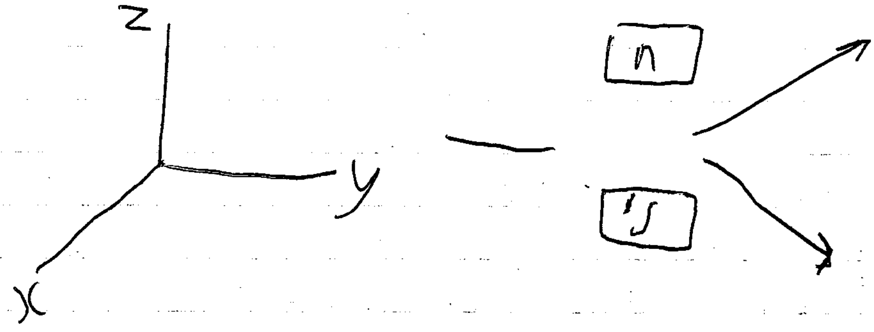


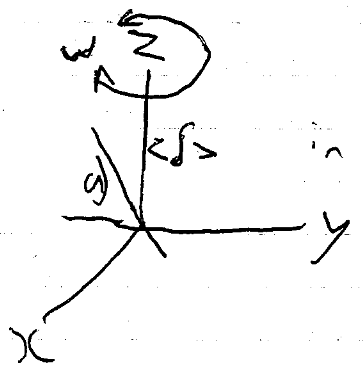

That come bursting out from the interior of the sun in pairs like ~~the~~ ~~the~~ light and and end of a funnel sand negative electrical frequencies of charge ions - electrons which ~~c~~ creates the - sound dominions

This electrons also seem to increase the ozone phenomenon + to the dive of $21\frac{1}{5}$ year rotations to time & space or ~~bit~~ light years

Different electric charges (positive or negative are built up by cloud gab of earth or ground, When the different between the ground & light arises beyond ~~&~~ electron fuses can create a spark and visibility from on - on off - off which creates a space time [circled arrows] creates a current of air that expands & contracts.

$X_{spin} = X_{s} + X_{PL}$



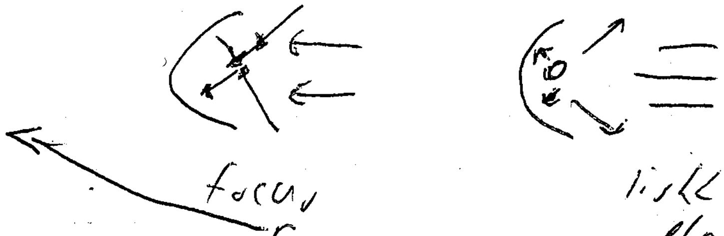

wave —

in a uniform magnetic field

Suppose the earth made a transition to the next lower orbit A + B or the classically the angular momentum of a particle is given with formula $L = r \times p$ to calculate R in terms of fundamental constants of nature to ground state

$$f = \frac{r}{2}$$

Reflectors used in a parabolic shape



focus

$r$

$a\sqrt{2}$

light source placed at focus +

Parabolic mirrors can bring a much wider beam which is parallel to the axial plane than do concave (

The direction of a light beam can be changed by using a piece of glass with a hexagonal surface prism the beam of light that emerges if n = would rotate to the critical angle of air mass.

$$\frac{\dfrac{x}{y}\,0.5}{\dfrac{y}{z}\,0.5} = 1$$

radiation from sources

In a nuclear reaction, the number of protons or neutrons in an atom is changed from one element - t to another only one type of reaction is called radioactive decay

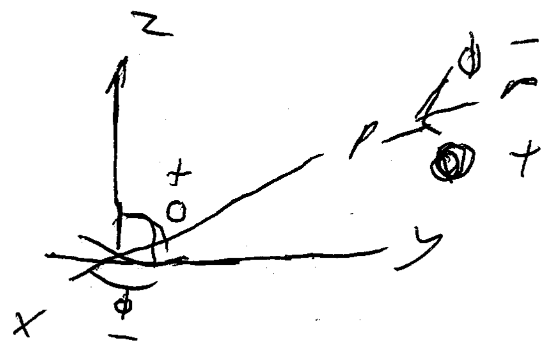
alpha (a) beta (b) gamma (y)

Alpha nucleus
a-particle or $\frac{4}{2}$ a) is emitted from the nucleus of a large atom

Beta nucleus
$^{0}_{-1}e$ or 0-1B, since it is not a nucleon, has no mass number it has the opposite effect to change a proton

This is electromagnetic radiation with a very short wavelength & high frequency. it occurs as a result of a nucleus being left in a very excited (high energy) state immediately following other type of radioactive wave decay, the nucleus emits the energy into the form of y rays gamma rays which travel at the speed of light

Some substances such as lead & are not deviated by magnetic or electric fields



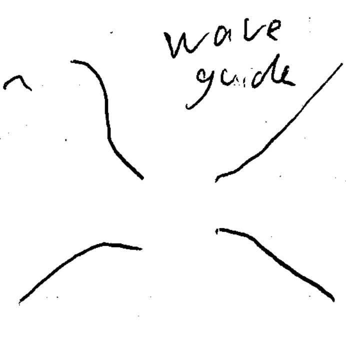
$$\frac{1}{R}\frac{d}{dr}\left(r^2\frac{dR}{dr}\right)-\frac{2mr^2}{\hbar^2}\left[V(r)-E\right]=l(l+1)$$

Notice that the angular part of the wave function, $Y(\theta\phi)$ is the same for all spherically symmetric potentials the actual shape of the potential $V(r)$ affects only radial part of wave function $R(r)$

N + 1 arrays with mirrored arrays have effects of stress rerun time.

$$R/4^{\circ}(T) = e^{-F}$$

E-data in



o clock

The temperature profile of a sequence has the following fine property. 2nd derivative & second temperature

$$T1 = (1-m1)$$
$$T2 = (2-m2)$$

Where $T_{si}$ is the steady state temperature

[Power & execution time]

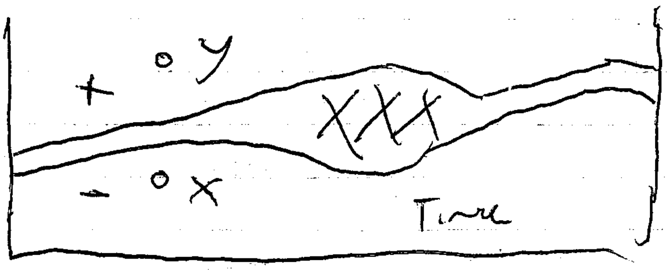
The algorithm starts with n single faults in the task set & constructs the metastable physical lemmas for these restricted states

If models labeled + with the labeled − this generates n/4+ subschemes of −N/2

In order to generate a surface we return to the mesh over which data is defined. If data points are scattered. where time steps

$$V = \frac{dp}{dT}$$

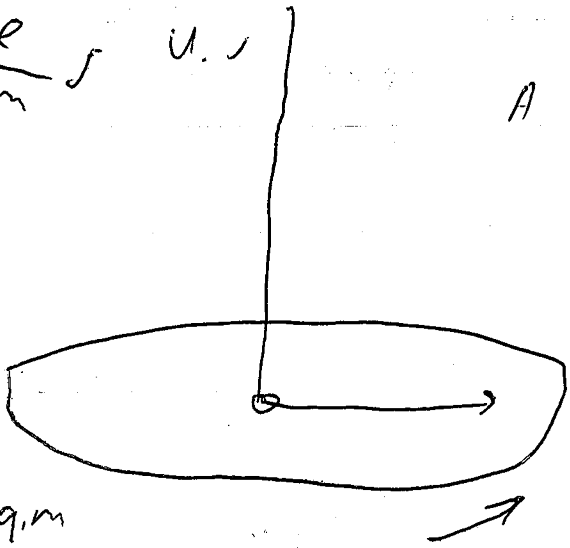
time steps are used to advance a particle based on particle positions. then used of high order interpolation temperatures are used in time lines because to move vector components with angle problem



$$Z^* = AB^{-1}Z.$$

1 vector of value to be predicted is Z is the i vector of known observation B is the covariance matrix relating the observations & A is the covariance matrix relating ~~the~~ to differentials between the values at locations to be predicted & the known values

$v_e = -\frac{e}{m} s$ U.J



A ring of charge, rotating axis

q, m

This is the spin orbit interaction; apart from two corrections (the modified gyro magnetic ratio for the electron & the precession Larmor which, coincidentally, exactly cancel one & other) it is due to the torque exerted on the magnetic dipole movement of the spinning electron, by the magnetic field of the proton in the rest frame

The magnetic dipole moment of a spinning charge is related to its (spin) angular momentum the proportionality factor is the gyromagnetic ratio which we have explored

First a charged q spread out around a ring of radius r which rotates about the axis in axial plane where the Time (T) rate the magnetic dipole moment of the ring is defined as the current (q|T) x times the area ($\pi r^2$):

$$u = \frac{q\pi r^2}{T}$$

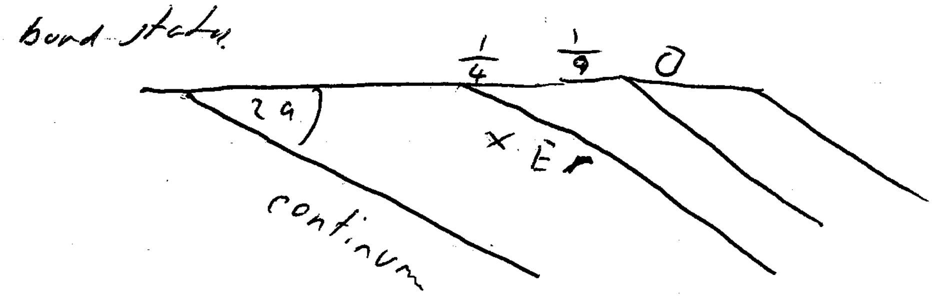
If the mass of the ring is m its angular momentum is the moment of inertia ($mr^2$) times the angular velocity ($2\pi/T$):

$$S = \frac{2\pi m r^2}{T}$$

A figure of revolution rotating about its axis. As long as the mass & charge are distributed in the same manner (so that charge-to-mass ratio is uniform the gyromagnetic be the same for each ring or opposite if the charge is negative

It has been shown that all the rays representing the continuous spectrum $(H_a)$, the are furthermost to the right in the complex plane-angle-plane is the ray starting at $E=0$

The behaviour of these sequences near the threshold is dominated by the long range $r^{-2}$ interaction between ~~two~~ values or channels e t h. bye ~~abili~~ abiliety of coordinateis rotation

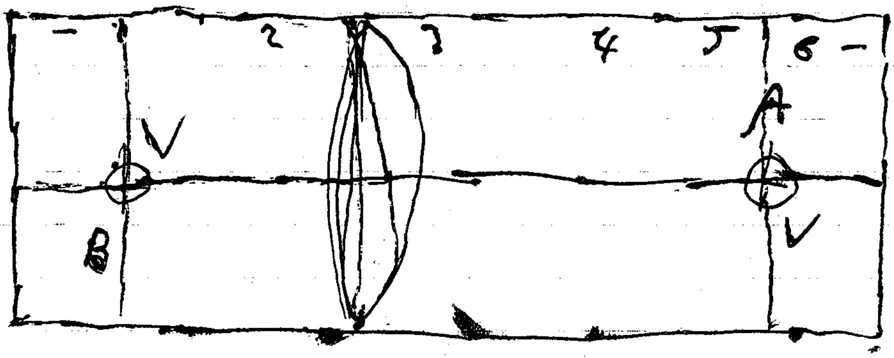



coordinate rotations have also been applied to photoabsorb...

The coordinate rotation method can be generalized to systems of several particles after removing center of mass motion, the N-particle H will be a function of several interparticle distances $(r_i)$ $j = 1, \ldots, N-1$ for suitability analytic potentials

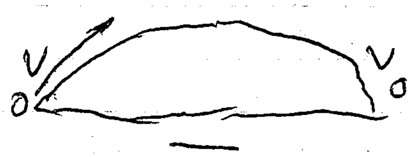
$$H_a = e^{-2ia} T + e^{-ia} V$$

where T, V are the kinetic & potential energy operators



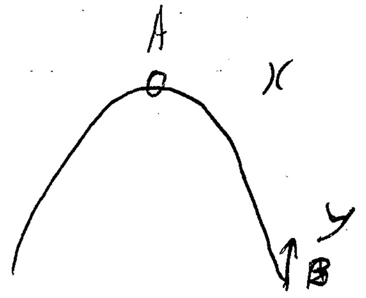

A projectile is any object that moves through the air without its own source of power under the influence of gravity, due to air resistance. This force is not constant, because its size changes with speed. Air resistance factors describing motion becomes difficult due to weight force $m s^{-2}$

The position & acceleration of A & B at equal lengths & time intervals show a parabolic path.




The maximum height of a vertical ↕ component velocity is zero momentarily but it changes value at twice the time

Wave fronb of point source, j travel at a 90° right angle to a direction in which wave are travelling



wave propagation →

sign-extension is able to operate on bit pattern of different lengths

Phase points along a wave undergoing similar motion at the same time are said to be in phase. Points exactly out of phase are ones moving oppositely to each other. In phase means differences to angles of $\phi°$ - 180°.

Example point a & b in wave propagation are $\frac{1}{4}$ wavelength apart & have a phase difference of 90° $(\frac{1}{4} \times 360°)$. in order to add representation of different lengths it is first necessary to represent them with the same area of number bits, example we ~~wit~~ wish to add a number with an area, where area is represented as whole values & negative values. the two values will the same number of bits. if we take the absence of a bit to be 0 then we are no longer adding a angle° if bits = 0 We have changed the area of number being represented.

We have seen that convex hulls & Voronoi's diagrams holds the key to solution of many geometric problems, on the other hand these structures require $O(n \log n)$ time to construct even in the two-dimensional case. It turns out that many geometric problems can be formulated as linear programs

$$c^T x \quad \text{to} \quad Ax \leq b$$

Begin
I := 1 /* pointer into pattern keyword — $p = p_1 p_2 \ldots p_m$ */
J := 1 /* pointer into the input string $s = s_1 s_2 \ldots s_n$ */

While
I ≤ m and J ≤ n do
if $p_i = s_J$ then
begin I := I + 1 ; J := J + 1 end

else

begin i = 1 ; J := J − i + 2 end

if i > m then return "yes" else return "no"

end

The brute force algorithm looks into $O(mn)$ time on mace

$A \times (B \times C)$ is some vector
plane of $B$ and $C$ and
can be written as combinations
$aB + bC$ where $a$ & $b$ are
scalars. we can simplify the
work by choosing our coordinate
system.

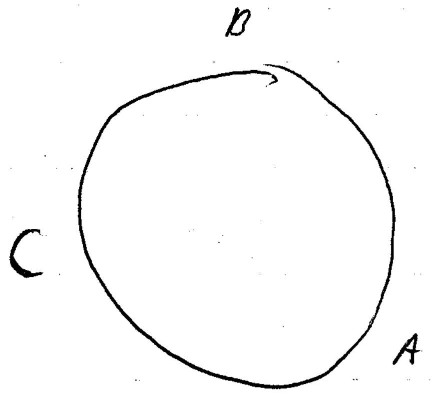
$I = P$

$I \cdot 1 = \ddot{I}$

$I \cdot I = -1$

$I \cdot J = K$

$I \cdot K = -J$

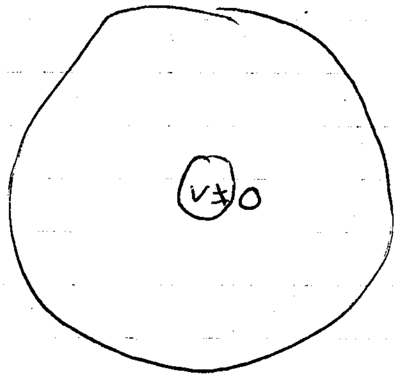



$$(A \times B) \cdot C = A \cdot (B \times C)$$
$$= C \cdot (A \times B)$$
$$= -(A \times C) \cdot B$$

$$A = |A| = \sqrt{A_x^2 + A_y^2 + A_z^2}$$

integer solutions $x$ & $y$ for given
integers, $a$, $b$, $c$. these projections
are called the components of
vector. relative to the coordinate
system

in optics it would be called the radiation zone. As in one-dimensional scattering theory, we assume that the potential is localized in space to some finite scattering region ($\Omega$) it is assumed ~~zero~~ 0 ≠





$\int 2\pi$

Whatever happens in the interaction region $(-a < x < 0)$ the amplitude value of the reflected wave has got to be the same as that of previous wave by conservation of probability. But it need to know the same phase. If there were no potential at all $B = -A$, since the total wave function must vanish at the origin as declared

Applying the theorem recursively, we can eventually express $|A|$ as a sum of determinants of order $|B|$. For a determinant of order it follows from the definite that the follows useful properties of determinants can be derived from the basic definition of a determinant

When the object is in a given segment of the track, the simulator first instantiates the algebraic expression of velocity & of normal force.

Then it inspects the instantiated expression. Based on the properties of the trigonometric functions & inequality relations, it determines the next step for the motion of the object, which can either be slide, or detachment or moving onto the next segment. For the through-going event, this process iterates repeatedly until the end of the described activity is reached.

Along with the simulation, the simulator also prints out qualitative description of motion.

Upon request, the simulator will also provide some local information. More specifically for an object with a local height (y); the information provided include the normal force $N_s$, $N_c$, $N_l$ or the tangential velocity $v$. For each parameter, whenever possible, its qualitative value is returned; otherwise its sign is returned.

One can verify the monotonicity relation that by printing out a number of corresponding value for normal force & ~~other~~ object height.

A dense matrix is one whose elements are mostly nonzero, so all its elements have to be taken into account in a solution method involving such a matrix such as a solution of a system of linear equations.

The method used for this problem is ~~Iterative~~ forward we use the fact that the rows of A can be interchanged if the corresponding elements of b also interchange or that row & another provided similar transformations are performed to the elements of b. These properties can now be used to transform A into an upper 90° angle which must be 0 making the elements below the diagonal line for each column to zero 0

The Qualitative simulator of Algebraic Reasons.

Q> (outcomes? (s times 3R) S1)
Begin in S1 from rest moving.
3*R initial height:
Pass through path S1
Fly away at start of S2 end of run
Q> (Outcome! (times 2.4 R) S2)

Begin in S1 from rest moving to
2.4*R right, initial height:
Pass through path: S2

Fly away at start of: S2 **** end of run
Q> (outcome? (stime 2.2R) S1)
Begin in S1 from rest moving to right,
initial height:

2.2*R
Pass through path: S1
Pass through path: S2
Pass through path: S3
Pass through path: S4
Pass through path: S5 *** end of track ***
Q> (outcome? (stime 1.8R) S1)
Begin in S1 from rest moving to right,
initial height:
1.8*R
Pass through path S1
Slide back in S2 *** end-of-run ***

Q> (outcome? (stime 1.5R) S1)
Begin in S1 from rest moving to
right, initial height:
1.5*R
Slide back in S1 ** end of run
Q> (outcome? (stime 0.3R) S3
Begin in S3 from moving to right
initial height:
0.3*R
Pass through path: S3
Slide back: S4 **** **End-of-run**
Q> (outcome? (stime 1R) S3)
Begin in S3 from rest moving to
right, initial height:
1*R
Pass through path: S3
Fall off in S4. **** end of run.

Two matrices A & B, not necessarily square, are ~~said~~ said to be equal if they have the same number of rows & columns, $\boxplus$ & if a = b for all i & j

If A & B are both of order m×n, then addition is added to define the equation

For matrices A B C with the same number of rows & columns the following properties can be derived from A + B or B+C etc.

Where a, b are any numbers real or complex & 0 is the null matrix. The concept of matrix multiplication is somewhat more complicated. First Multiplication of two matrices A & B be the order it has been defined only when both orders are equal to the number defined. Numerical methods for solving linear systems may be divided into two types direct or iterative. Direct methods are those which in the absence of round-off or other errors, will yield the exact solution in a finite number of arithmetic operations, Iterative methods are those which start with an initial approximation & which by applying a suitable chosen algorithm, lead to successively better approximations.

$\theta_1 = \tan^{-1}(0nT/(-5nT))$
$= 180°;$
$(\sin 180°/2))^4$
$= 1$

$\theta_2 = \tan^{-1}(3nT/(-4nT)) = 143°:$
$(\sin(143°/2))^4$
$= 0.81$

$(\sin \theta_1/2)^4 / (\sin \theta_2/2)^4 = 1.0/0.81 = 1.23$

compare the power available to the magnetosphere when the IMF is oriented southward with a value of $B_z = -5nT$ with the power available when its components are $B_z = -4nT$ & $B_y = 3nT$.

assume: the solar wind speed is the same in both cases; a due north field corresponds to a clock angle of ~~zero~~ 0

geomagnetic storms last several days during which the ~~[illegible]~~ perturbed magnetic field that creates. the ring current also produces a noticeable low-level depression the earth's surface equatorial. magnetic field

Perhaps the most innovative & promising method of signal integrity monitoring is through.
frequency - mhz

space based monitoring rather than ground based monitoring. This capability known as satellite integrity monitoring or SAIM, would require the instruments of GPS satellites to monitor transmitted L-band signals from each other for accuracy & usability. If an anomalous signal is detected, neighbouring satellites could inform the faulty satellite through the crosslinks. The faulty satellite could then autonomously begin broadcasting a code that could not be tracked by users receivers. At the same time, the faulty satellite could inform the master control station (through the crosslinks) that there is a problem.

With SAIM, the response time for commanding the faulty satellite to transmit a nonusable code to the users, after detection of a signal anomaly would be less than 1 second, such a response time would meet all of the current integrity requirements including those of the most stringent aviation applications.

In order to fully implement SAIM however, extensive satellites mods are needed.

for example a new crosslink design concept is required that is based on a CDMA (Code Division Multiple Access) protocol rather than the current Time Division Multiple Access (TDMA) protocol.

This new crosslink would transmit the same navigation message observed by users to each neighboring satellite, which could then detect anomalies in the message. Since the required design modifications could be significant, fully operational savings would probably have to be incorporated in the block IIF satellite design rather than the block IIR satellites already under construction. There is however a less extensive modification that could be incorporated in block IIR satellites to provide significant integrity improvements in impeded monitoring. This modification would consist of the installation of a radio frequency field probe in the antenna near field region of block IIR satellites, which would monitor the integrity of its own satellite L-band transmissions.

Since the Block IIR crosslink transmission data unit is currently designed to transmit data every 36 seconds, the integrity information derived from the radio frequency probes could be transmitted to all other satellites in the constellation

An additional ground command was used to ASC to transfer the wiring information to the main Nav Task probability.

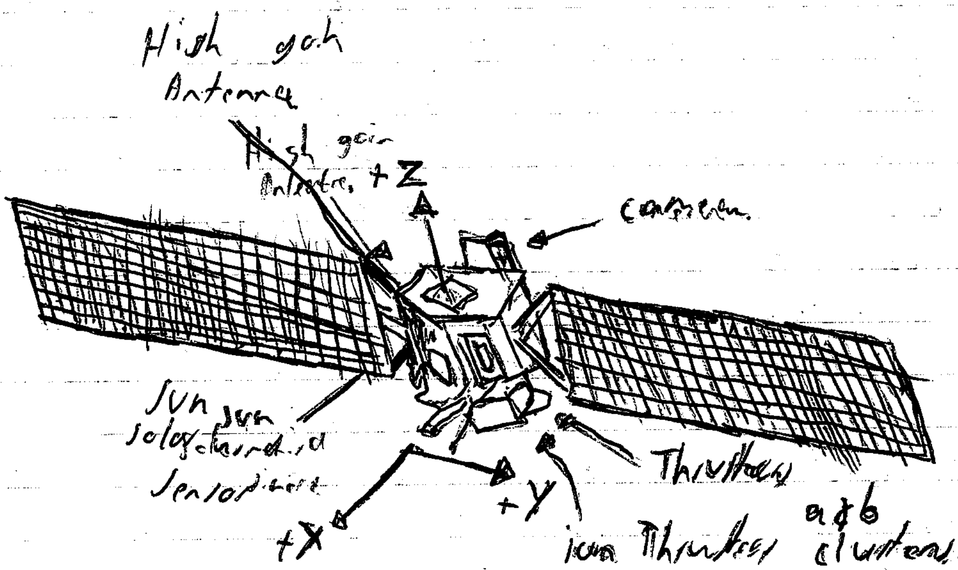
This ACS-Nav interface required an additional queue interface to be added to the Nav task. During tracking (image Track) operations, the ASC task would initiate an image by directly sending exposure pass of gamma b-L raise commands to the camera manager, with the request that were pass on to navs = 1, 2 resp. following exposure. The extended image command interface developed for navs use is the user-defined information provided image handling, routing & processing information together.

Filter type were handled

0 – Diff – class A
1 – Diff – class B
9 – 0
b – 1

This was intended to ensure that background image was subtracted to reduce subtle changes in light of Mical images

# Nav Sat.




Now for processing with the data that processed residue - or fragments - data would show up on each image, but not transient results from cosmic rays eg French aroyl or other interference

This was used as a means of removing most of the noise from stray light astrophysical = objects = random images towers.

0-1 = This is the first two batch hear
1-0 heat images

Which relates to the change of a negative to a positive which leads to the results of cosmic interference.

An ensemble reference clock can be used to reduce clock errors, relax requirements for clock stability and eliminate the need for atomic clocks on some satellites. In order to improve the accuracy of the instantaneous frequency offsets further, more accurate atomic clocks must be used on the satellites that will be carrying atomic clocks. A candidate future reference clock is the hydrogen maser. For terrestrial use, oscillators based on hydrogen masers have become the standard because they provide the best combination of low phase noise, acceptable stability and freedom from drift, reliability, or cost.

Hydrogen masers have been developed for space use, but have not been flown to date. It is possible that hydrogen masers could be incorporated on Block IIF ~~satellites~~ or the possibility of clocks satellites so should be examined. If it appears viable an oscillator suitable for GPS spacecraft should be in development.

The GPS relies on the principle of "pseudoranging" to provide accurate ranging to its users. Each satellite in orbit continuously transmits a radio signal with a unique code.

called a "pseudorandom" Noise (PRN) code, that include data ~~about the~~ [them] about the satellite position & exact time that the coded transmission was initiated, as kept by the on-board atomic clocks. A pseudorange measurement is reading by measuring the distance between a user receiver & a satellite by subtracting the time the signal was sent by the satellite from the time it is received by user

Once three ranges (or distances) from three known positions are measured, a position in all three dimensions can be determined. In the case of GPS however a fourth satellite is generally needed in order to eliminate a common bias in the "pseudorange" to all satellites caused by a lack of synchronization between the satellite & receiver clocks. Once this biased clock is eliminated by the presence of a fourth satellite, a highly accurate three dimensional position can be determined.

This measurement is also affected by similar delays caused by the Earth atmosphere.

Pseudorange concept.

$x_i\ y_i\ z_i$ = satellite Position ($i$ = 1, 2, 3, 4)

Receiver user solve for: $U_x\ U_y\ U_z$
CB = clock Bias

To solve $f(e) = 0$ or $g(e) = e$
$f(e) = e - 2 * \sin(e) - 5$
$g(e) = 5 + 2 * \sin(e)$
read (5,3) $x$
$y = f(x)$
write

Instead of transmitting one PRN code on radio signal as described above, each satellite actually transmits two different spread spectrum signal that contain two different PRN codes that are called the coarse Acquisition (C/A) code & the Precision P (code)

A pseudolite or pseudo-satellite is a ground or land based GPS transmitter capable of producing a signal similar to that of an actual GPS satellite. This signal can be received by a ordinary GPS receiver without the need for additional frequency reception capability.

Pseudolite can improve accuracy, reliability, availability, integrity, availability & continuity of service by simply increasing the satellites to the receivers or ground based

Variations in solar activity influence thermosphere density levels and the thermal environment. When solar activity is high, solar extreme ultraviolet (EUV) radiation heats and expands Earth's upper atmosphere. Additionally geomagnetic storms add energy to the auroral zones via particle and Poynting flux deposition. Impulsive causes increase propagate out of the auroral zones as travelling atmospheric disturbances such heights change and composition changes. The associated enhancement of the upper atmosphere neutral density increases satellite drag, is momentum transfer from atoms or molecules in the atmosphere, the more atoms or molecules the spacecraft encounters the greater the momentum transfer and thus the greater the drag.

Forecasting satellite lifetimes depends upon a knowledge of the initial satellite orbit, the satellite drag coefficient, the satellite mass to cross-section area (in the direction of travel) and a knowledge of the upper atmosphere density and how the density responds to energy ~~and~~ inputs, which must also be predicted. Even when the density responds to energy inputs which must also be predicted. Even when most of the quantities are known a 10% uncertainty remains in the satellite lifetime - in other words, the error in predicting the duration of a satellite expected to remain aloft for 10 years is one year, whereas the demise of a satellite

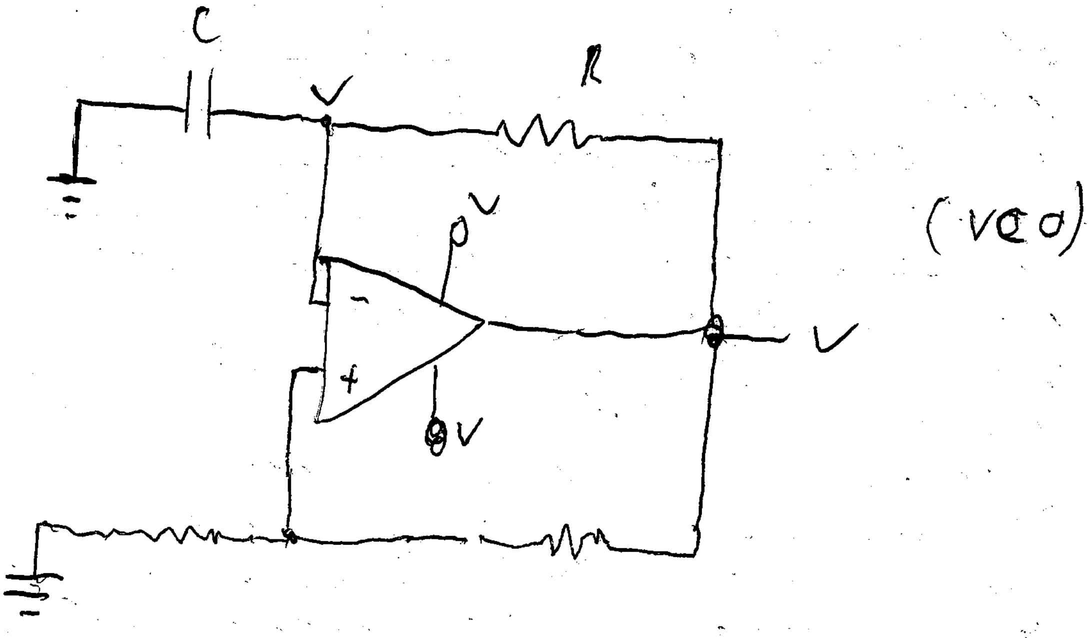
~~expected to remain at the same stack~~
~~to~~

expected to result in ~~?~~ hence it is accurate to about 2 hours, whereas observations & models decrease but short-term forecasting uncertainty

The dynamics of a satellite experiencing drag can be rather counter-intuitive as the satellite encounters higher density & hence more drag, its mechanical energy decreases, its altitude decreases but its speed increases. The speed increase comes from the conversion of some of the mechanical energy to kinetic energy even as the drag force continues to act.

The drag force on a satellite is given by

$$D = (1/2)\rho v^2 A C_d$$



At the demultiplexer in the receiving destination, the received bit stream is synchronously demultiplexed into parallel ↔ synchronous data channels

Each data channel is read into a buffer minus the stuffed pulses detected by the synchronizer receiver, and the buffer ~~contents~~ is read out by a phase-locked voltage-controlled oscillator.

which smooths the output clock stream

The VCO is driven by a filtered error signal based on whether the buffer is above or below a given threshold fill level. In general, each output channel requires its own VCO to smooth the output clock rate. Thus the VCOs smooth out the ~~gaps~~ gaps in the bit stream caused by the deleted stuffed pulses to produce output clocks that closely resemble each of the original input clocks.

The dynamics of these phase locked oscillators, hence the phase jitter characteristics on the output bit stream depend on several parameters

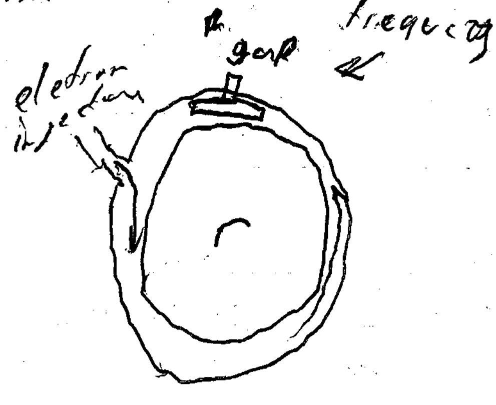
1. multiplexer & demultiplexer buffer design details
2. input bit stream dynamics
3. framing pattern & synchronization format
4. closed-loop response of the phase-locked loop

electron synchrotron

A cyclic Accelerator that is based on the Betatron but uses a constant-frequency electric field in addition to a changing magnetic field. ~~+ addition to~~

As in the betatron, the increasing magnetic flux density of B conducts the relativistic increase in mass at high velocities. A high-frequency electric field from a radio-frequency oscillator can be applied across a gap in a metallic cavity inside the circular chamber. The frequency is in synchronization with the constant angular frequencies of the electrons, which are thus accelerated inside the radio particles.

If an electron is describing a circular orbit of radius r in the magnetic field between the poles of an electromagnet force of a accelerated electron. If the field at the circumference of the orbit is equal to ~~half~~ $\frac{1}{2}$ that of the field inside the orbit




electrons in
free space
can carry
quantum orbital
angular momentum
projection angular
momentum

The function of time & frequency $(A(T,\omega))$ performs the operation of filtering the signal over a limited time & frequency bandwidth so that the results may be considered stationary over this small. It is therefore confined to functions that are found to change slowly in time.

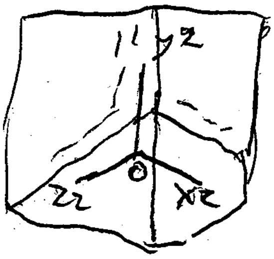
The optimum width of the time & frequency window implicit in the definition

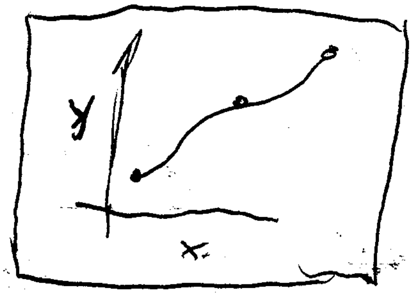
$$f(t,\omega) = |A(t,\omega)|^2 f(\omega)$$

however it is difficult to obtain analytically & method of analytical in large amounts of regions unless long sequences.

Amplitude domain analysis in the form of probability estimates has been proved useful in predicting the behaviour of system to environmental stress. For predicting response on regular harmonic structural & random input for vibrational testing it often behaves as valid, that amplitude probability density measurements were taken an essential element in the evaluation of physical stress of physical systems.

If the coordinate axes are rotated to new positions $0 x y z = 0$ & the known values of $x_y, y_y, z_z$, are known as principal stress & their directions.




A method for describing the electrostatic structure of molecules using quantum mechanics

The successive approximations are increasing monotonically, indicating that acceleration could profitably applied. If we take the results of certain iterations & apply we obtain a correct to two significant figures

Dimension A(20,20), AK(20), X(20)
write
initialize
N = 20
EPS = 1, E-5.
ICNTR = 0
DO 10 I = 1,N.
AK(I) = 0.0
X(I) = 0.0
DO 10 J = 1,N
10. A (I J) = 0.0

= to Reynolds number

A 3rd dimensionless quantity equal to ρvl/η where ρ is the density & viscosity η in motion with speed v relative to some solid characterized by the linear dimension l. For steady state flow through a system with a given geometry the flow lines take the same form at a given value of the Reynolds number.

The geometry of least squares.
The left panel shows a straight line model fitted to 3 data points by least squares. The right gives a geometric interpretation of the fitting process

The 3 dimension space shown is spanned by 3 orthogonal axes: one for each response variable. The observed response vector is shown at a given point within the space least squares fitting finds the closest point in the model subspace to the response data which then relates to residual vector.

Three mutually perpendicular lines Ox Oy Oz are drawn through a point O known as the origin. These lines & O are fixed in the frame of reference, & in which work may themselves be the frame of reference.

It is possible to predict the value of response at a new values of the predictor variables using the predict function

eg. the model predicted counts for m.vol values of 10.

```
> df <- data.frame (m.vol=c(10))
> predict (sc2.mod2, df, se=true)
$ fit
```

Rob64

The study of the earth's magnetic field & its variations. At any point on the earth's surface three magnetic elements are defined:
$B_0$ is the horizontal component of the magnetic flux density at the location.
$\delta$ is the angle of dip (often called the inclination), between the angle of vector $B_0$ & the resultant magnetic flux density at the location, often called the variation or [illegible]. The vertical component of the earth's magnetic flux density $B_v$ is given by

$$B_v = B_0 \tan \delta$$

Two main kinds of variation in these elements are observed. Secular variations take place slowly & are associated with periodic & semiperiodic

An analogue to digital converter is a device that takes a continuously-varying real number & converts it into an integer, ideally the integer next or the nearest integer. The result is presented in the standard way usually to a base of ten to 2. eg

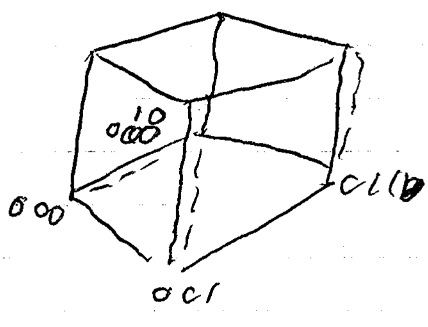
Conversion. There are points in the operation where several digits must change simultaneously, causing [illegible] conditions. The change is not quite simultaneous.

To eliminate this error we need to arrange the numbers in order (different to the usual order) so that one digit changes at each step. If this can be done, the only possible error will arise from a time delay in the mechanical realisation of the devices & will be at most 1 in the case of binary representation. Such a sequence is known as a Gray code, which is a natural graph-theoretic interpretation.

The n-cube $Q_n$ is the graph whose vertices are all n-tuples consisting of zeros & ones, two vertices being adjacent if they agree in all but one position.

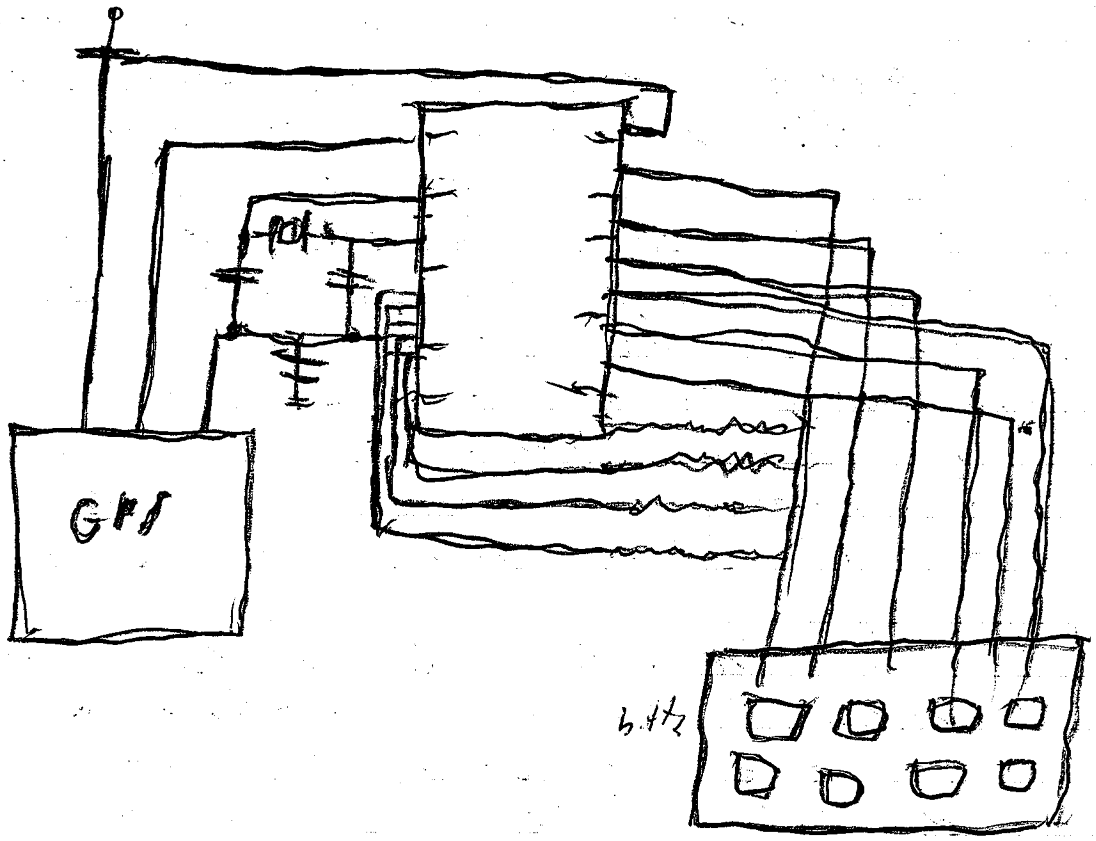
The n-cube consists of the vertices & edges of ~~the~~ the familiar regular polytope of the same in ($R^n$)

The case $n=3$




For practical use it is necessary to be able to encode & decode at once by induction the extended procedure with base b does indeed give the representation for the ultimate numbers

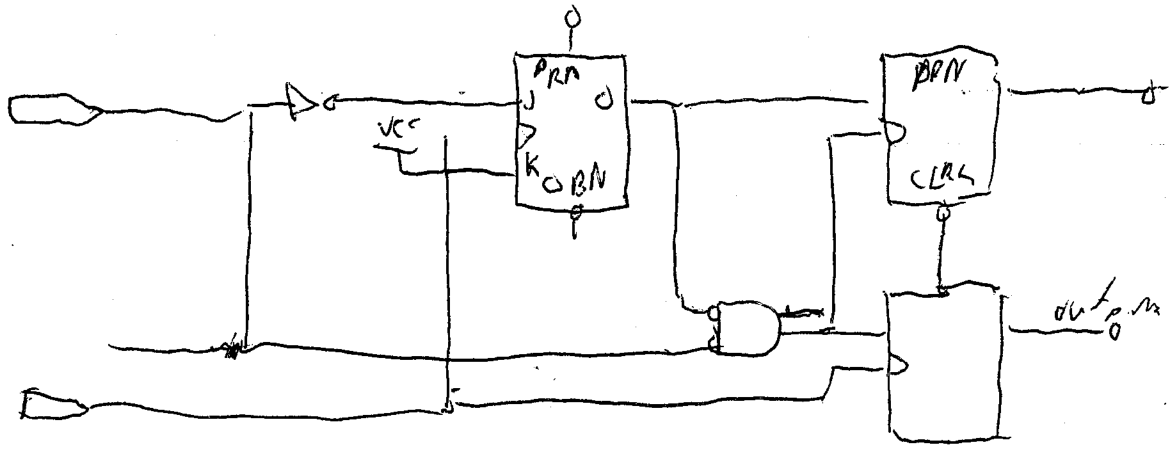
# GPS Odometer.




The reflected binary code, also known as reflected binary, is an ordering of the binary numeral system such that two successive values differ in only one bit

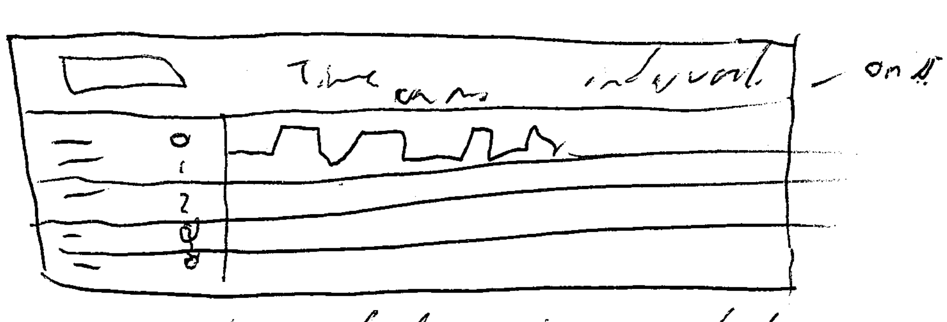
A Gray code is a numeral representation of a cyclic of encoding scheme where it will rollover or repeat.
A number of unit-distance automated changes code, where only one bit a sequence changes when only one bit of a square changes as the number count progresses. gray codes provide more reliability to misalignment or synchronization because they limit the maximum reading error by one to unit.

This property also makes them useful in error detection schemes better than a parity check, communication systems use gray codes to detect unexpected changes in data. If the bits in a number are summed, the sum of the next bit number should only change by one with the sum of alternating even to odd.




State machine with synchronous outputs

The state variable is stored from state to state, This state is clocked through as a flip flop to generate non-overlapping via another.




This indicates that two outputs are synchronous with the clock, but delayed until start of cycle - ie states