GNSS

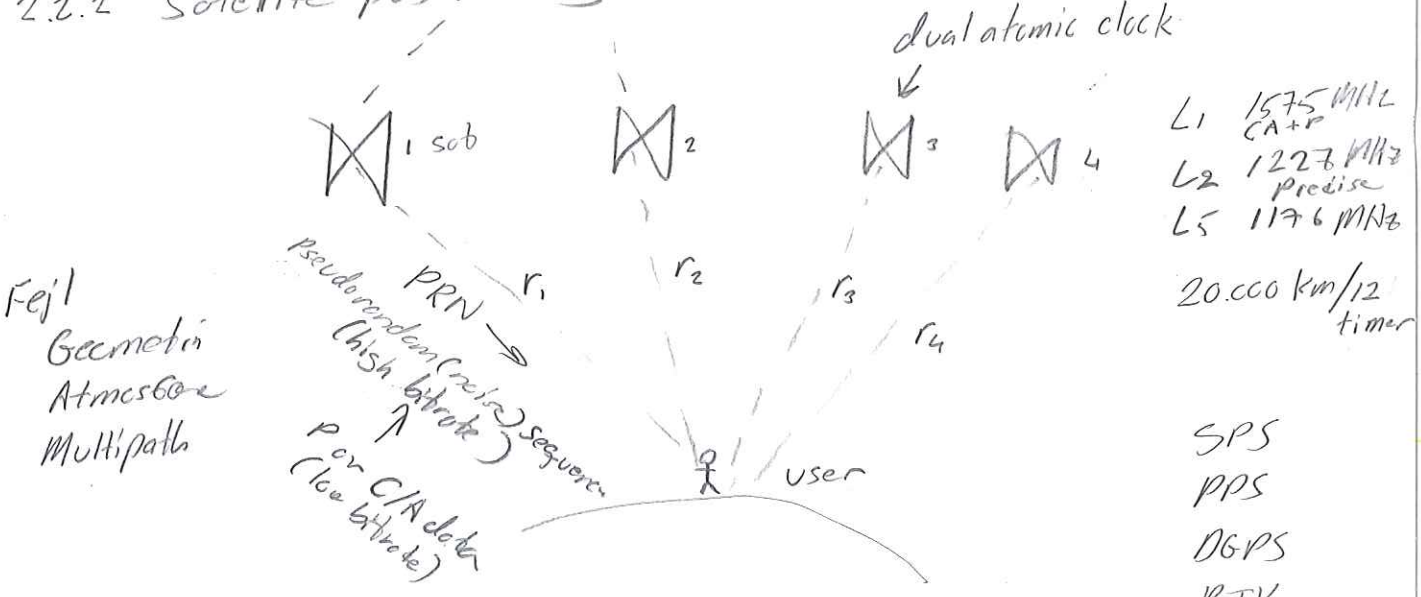
Hvad er GNSS konceptuelt

GPS

Til hvilket niveau har vi brug for viden?

- Virkemåde (fejlretning)
- Availability
- Accuracy
- Interfacing
- Coordinate systems, projections, datums

2.2.2 Satellite positioning



Fejl
- Geometri
- Atmosfære
- Multipath

SPS
PPS
DGPS
RTK

Pseudorange: $\rho_i = |r_i| + b_u \cdot c + \varepsilon_i$

b_u: user clock bias

ε_i: sum af målefejl for satellit i

Solving for x, y, z, b requires 4 equations (satellites)

2D fix: Solve for x, y, b, use z from table

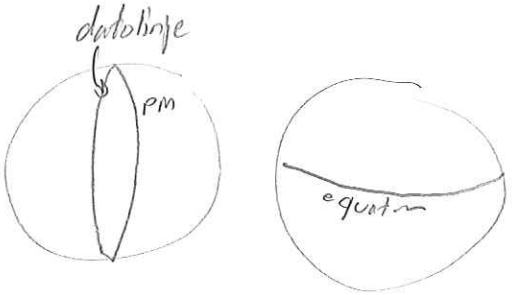
DGPS

RTK PRN (Periode) 300m long, precision 0,5 m, bærebølge periode 19 cm long

Præcision ca. 1mm

Geografiske koordinater

Længde- og breddegrader



$[-90; +90[$

$[-180; +180[$

N 55.36732°	N 55° 22.039'	N 55° 22' 02.4"
E 010.43192°	E 010° 25.915'	E 010° 25' 54,9"

Accurate (storcirkelberegninger)

Not Euler angles and lines

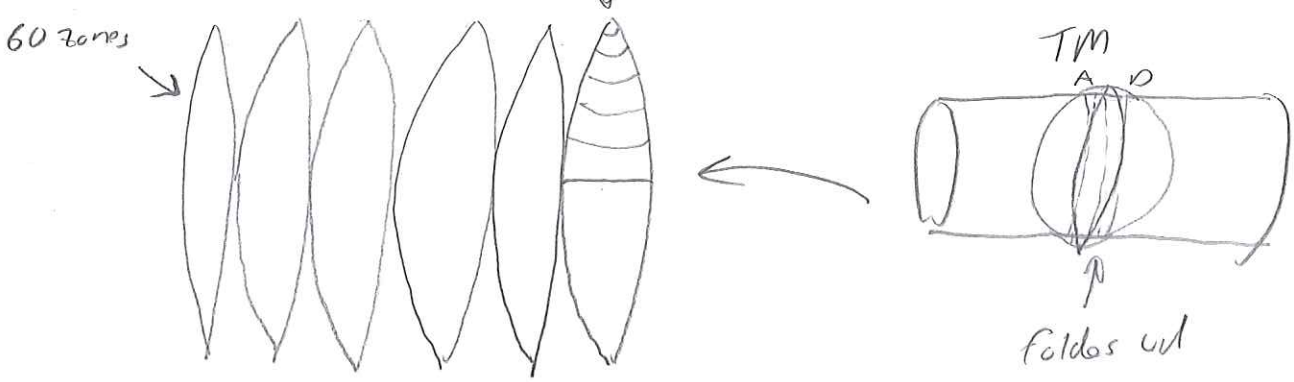
Decimal accuracy

Transverse Mercator Projection

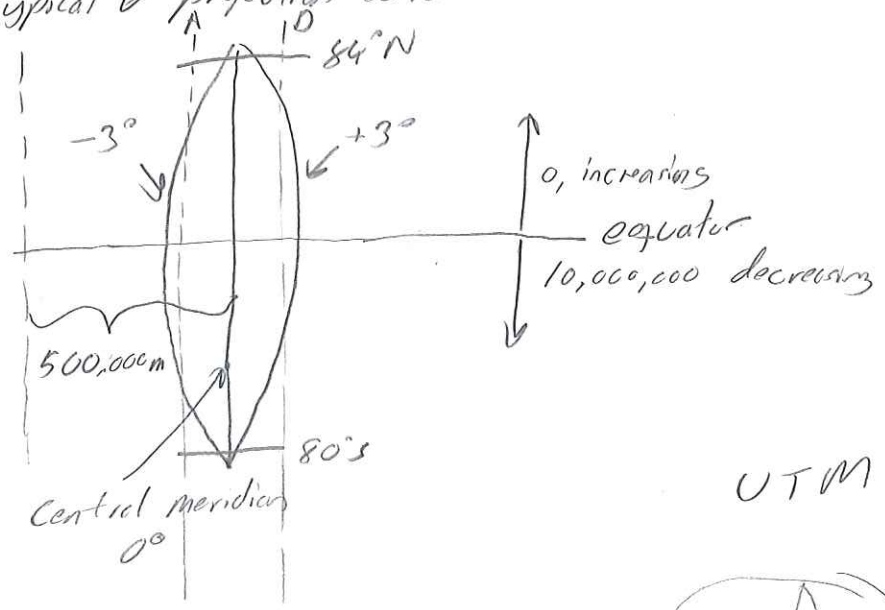
Map projection: Transformation between geographic coordinates and plane coordinates

Flattening → distortion 80°S to 84°N

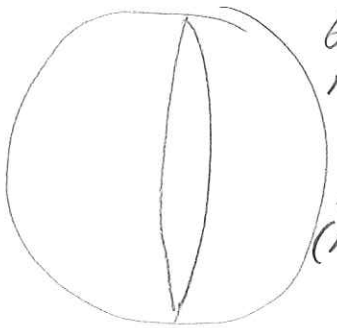
Appelsin co papir



typical 6° projection zone



UTM

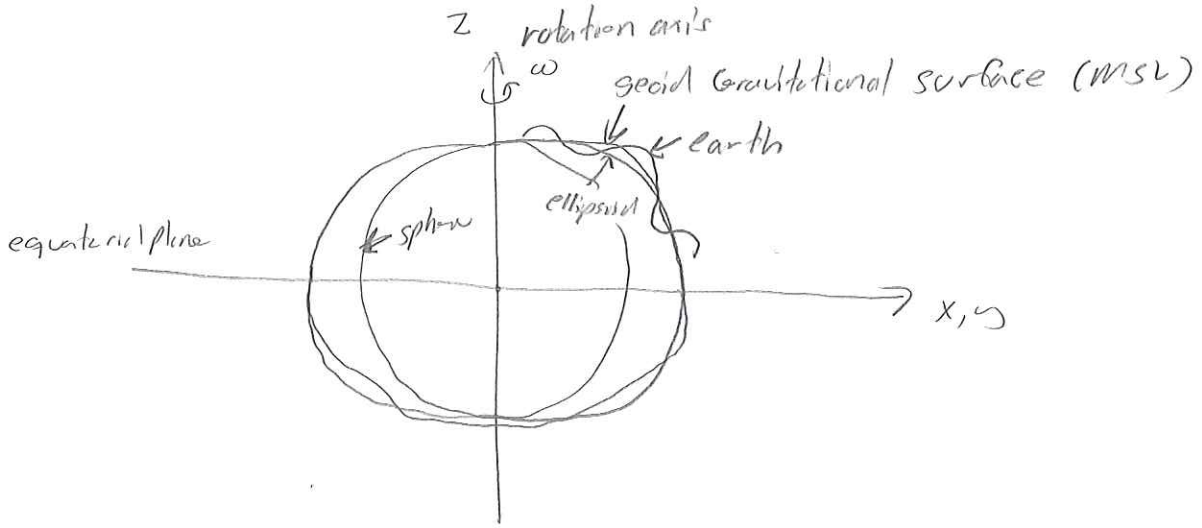


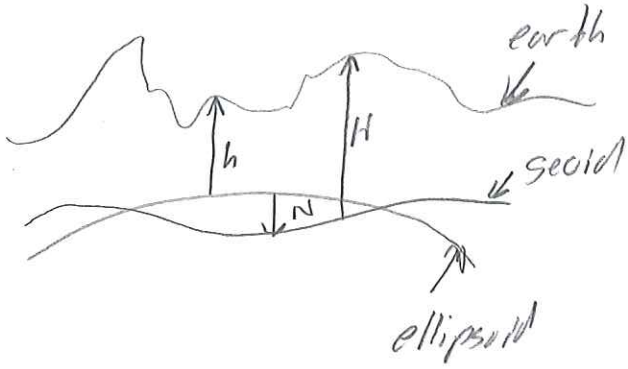
UTM

Example 32 U E590756mN6136601m

Problem med zone overgang

Datum





The orthometric height is the altitude above (below) MSL (geoid), also called geoidal height and often altitude or elevation

h: ellipsoid height (measured + gps)

H: orthometric height (MSL) (geoidal height)

N: geoid height / separation
negative when geoid is below WGS 84

$H \approx h - N$

$GPGGA

Field 9: Orthometric height (H)

Field 11: Geoid separation (N)