Explain your answers with neat sketches whenever possible. If not clearly stated, assume that all computations are made on Helmert1906 (a = 6378.2 km, $f = \frac{1}{298.3}$). Also, the mean radius of the earth is R = 6371 km.

Assignment (5)

1. Write short notes on direct and inverse geodetic problems.
2. Express your views about why there are many algorithms to solve the direct and inverse geodetic problems.
3. Two stations R & D having the following geodetic coordinates (23° 56′ 51.26413″ N, 32° 36′ 33.67373″ E) and (23° 32′ 27.52946″ N, 32° 27′ 10.34257″ E) on WGS 84. Determine the geodetic length (RD) as well as the forward and reverse azimuths of RD.

4. Two geodetic triangulation stations RAMO and DRAG. The geodetic coordinates of RAMO are (30.5977778° N, 34.7630556° E) and the forward azimuth from RAMO to DRAG is 27° 27′ 39" and the geodetic length RAMO-DRAG is 125615.811 m. Compute the latitude and longitude (φ_2, λ_2) of point DRAG along with the reverse azimuth from point DRAG to RAMO.

   Answer (31.5930556° N, 35.3919444° E)

5. The proposed route for planning a project in Egypt started from station K and ended at station H. Compute the length, azimuth, and back azimuth for this proposed route; if the geodetic coordinates of these stations on Helmert 1906 are (29° 47′ 55″ N, 31° 55′ 20″ E) and (29° 41′ 09″ N, 32° 15′ 20″ E) respectively.