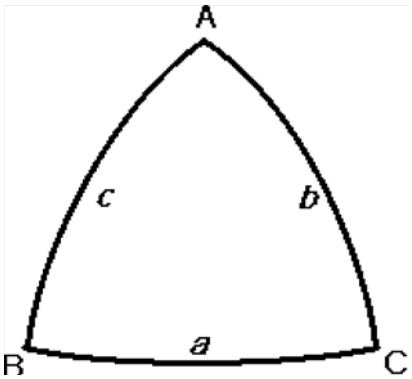


Law of Cosines for Sides:

$\cos(a) = \cos(b)\cdot\cos(c) + \sin(b)\cdot\sin(c)\cdot\cos(A)$

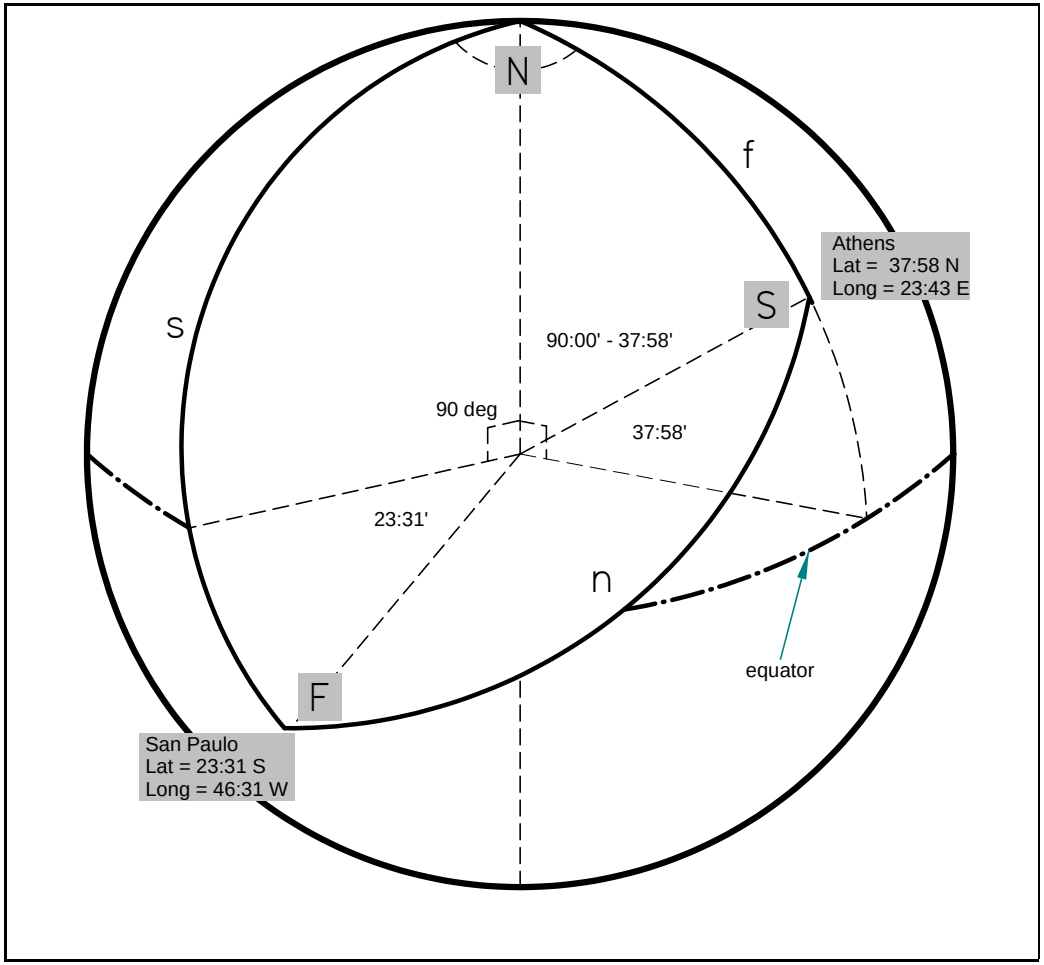
For the problem to the right:

$N := \left(23\cdot deg + \frac{43}{60}\cdot deg\right) + \left(46\cdot deg + \frac{31}{60}\cdot deg\right)$

$N = 70.233\,deg$

$s := 90deg + \left(23\cdot deg + \frac{31}{60}\cdot deg\right)$ $\quad s = 113.517\,deg$

$f := 90\cdot deg - \left(37\cdot deg + \frac{58}{60}\cdot deg\right)$ $\quad f = 52.033\,deg$



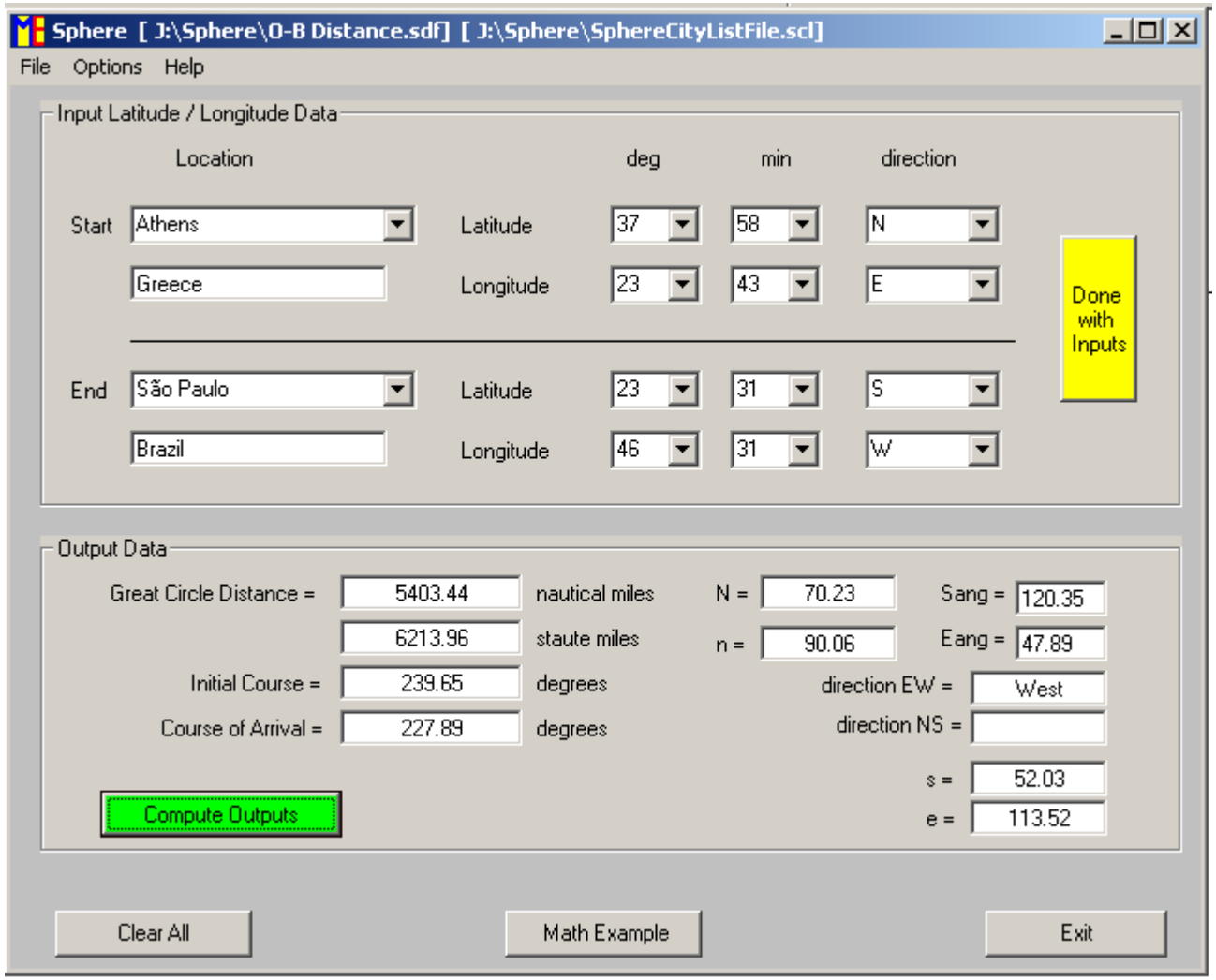
Using law of cosines for sides:

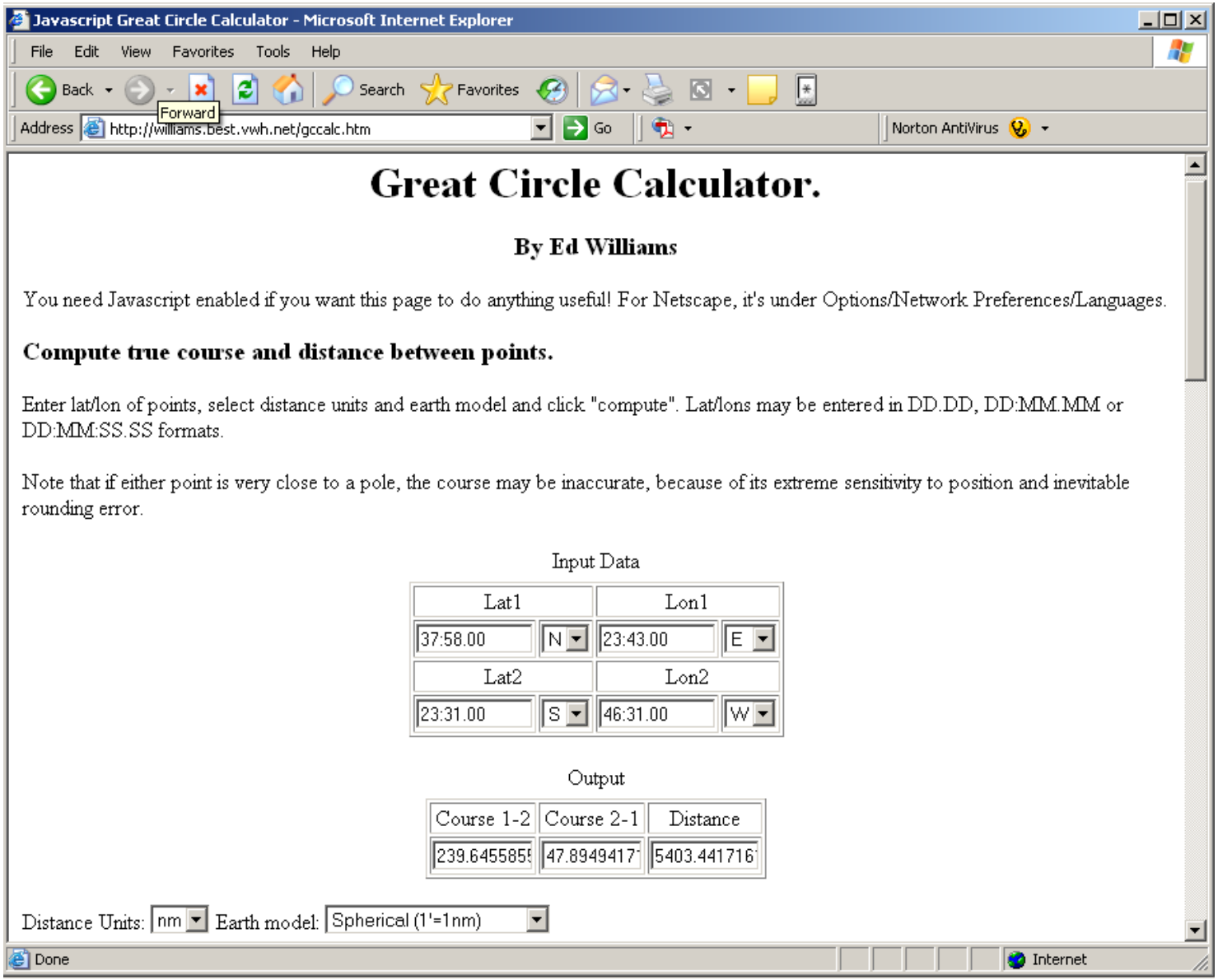
$\cos(n) = \cos(s)\cdot\cos(f) + \sin(s)\cdot\sin(f)\cdot\cos(N)$

Since 1 Nautical Mile = 1/60 degree of arc (1 minute), we define: $NMi := \frac{1}{60}\cdot deg$

Solving for n: $n := acos(\cos(s)\cdot\cos(f) + \sin(s)\cdot\sin(f)\cdot\cos(N))$ $\quad n = 1.572$ $\quad n = 90.057\,deg$ $\quad n = 5403.442\,NMi$

Solution from Sphere.exe




Javascript Great Circle Calculator - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Search Favorites
Address http://williams.best.vwh.net/gccalc.htm
Go
Norton AntiVirus
Great Circle Calculator.
By Ed Williams
You need Javascript enabled if you want this page to do anything useful! For Netscape, it's under Options/Network Preferences/Languages.
Compute true course and distance between points.
Enter lat/lon of points, select distance units and earth model and click "compute". Lat/lons may be entered in DD.DD, DD:MM.MM or DD:MM:SS.SS formats.
Note that if either point is very close to a pole, the course may be inaccurate, because of its extreme sensitivity to position and inevitable rounding error.
Input Data
Lat1
Lon1
37:58.00
N
23:43.00
E
Lat2
Lon2
23:31.00
S
46:31.00
W
Output
Course 1-2
Course 2-1
Distance
239.6455855
47.8949417
5403.441716
Distance Units: nm
Earth model: Spherical (1'=1nm)
Done
Internet