Homework 3b

Cameron Lane

CJL3282

1)

JD_{UTI} = 2459629.74930427
$theta_{ERA}$ = 5.094194831139650e+04 radians

W Matrix: W =

0.999999999999997	-5.02960587195337e-11	-8.12935581357585e-08
5.04369830566906e-11	0.999999999998497	1.73352403885434e-06
8.12935580484469e-08	-1.73352403885844e-06	0.999999999998494

R Matrix: R =

-0.520437212092403	0.853899940431833	0
-0.853899940431833	-0.520437212092403	0
0	0	1

PN Matrix: PN =

0.999999999773384	-5.53896235428886e-08	0.00212557524464342
1.01377935810267e-08	0.999999999773385	2.12891916943869e-05
-0.00212557524534093	-2.1289122052659e-05	0.999997740735773

Q_{GCRF}^{ITRF} Matrix: Q =

-0.520437164461401	0.853899965405303	0.00212709780895228
-0.853899945538927	-0.520437203310978	2.04564178565521e-05
0.00112448852811387	-0.00180568244422723	0.999997737515671

2)

$Theta_{GMST}$ = 4.16991131806314

r_{GCRF} for Q = R_3(-$theta_{GMST}$):
-4295.39724275466
3456.64811985493
3196.066

r_{GCRF} for Q = PN R W:
-4272.28252523703

3477.59348022302
3204.3259593577

Error = 32.2680215609783

The GMST transformation is accurate for the first component of r. The difference in the second and third components is significantly larger. GMST is easier and quicker to use whereas CIO is much more accurate.