
Additional Exercise

For an East-West array, all the antennas lie on the y -axis in the corresponding XYZ frame. This means that when we transform to UWW co-ordinates everything lies in a plane that pivots into $w \neq 0$ around $v = 0$, i.e. the u -axis. This means we only need a single rotation to bring the w -axis inline with the NCP and that w is just a function of v :

$$w = -v \cot \delta$$

For an array with some North-South geometry the plane will not pivot solely around $v=0$, but rather in a plane that is a function of both u and v . This means that two rotations are needed to bring the w -axis in line with the NCP. In this case

$$w = u \sin \chi \tan Z - v \cos \chi \tan Z$$

Derive this expression.