

Here is a video of the first launch of NASA's Space Shuttle from the Kennedy Space Center in Cape Canaveral, FL, in 1981: <https://youtu.be/kdK1tNx42AQ?t=3m50s>. Watch a minute of it. As you can see the camera (which has a fixed location) follows the shuttle going up into the atmosphere. In doing so, the angle between the horizontal direction and the direction to which the camera is pointing increases as the shuttle goes higher and higher in the sky.

Our goal is to determine how fast this angle increases with respect to time (such an information would be very useful if, for example, one wants to automate the camera).

- i) Draw a sketch of the situation (make it big enough, a least half a page).
- ii) What information do we need in order to determine the variation of this angle? Make a list.
- iii) Find an equation (or equations) that relates these pieces of information together?