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Example 2.12 Correction (from Tongue and Sheppard)

Example 2.12 illustrates the calculations required to solve for r double dot and θ double dot. However, the author makes a sign error in the calculation for θ double dot by substituting a positive value for θ dot into the expression for acceleration in polar coordinates. The value for θ dot should be –0.193 rad/s, as calculated in example 2.11. Using a positive θ dot yields a negative θ double dot, which is incorrect. θ double dot should be positive. The sign of θ double dot can be readily verified by making a plot of the angle θ versus time.

Sanity Check:

After examining the plot, it should be apparent that θ dot is negative at time t = 0 seconds, and approaches zero as time approaches infinity. Therefore, θ double dot should be positive, indicating the increasing negative value of θ dot. Intuitively, θ should start at 40° and then asymptotically approach 0° as time approaches infinity, due to the constant velocity of 15m/s in the positive ***i*** direction. Alternatively, theta can be plotted as a function of time using a trigonometric function. A plot of the function $\theta(t) = \tan^{-1}\{(50m)*\sin(40°)/[(50m)*\cos(40°) + (15m/s)*t]\}$ is shown below.