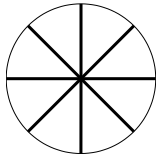


PROBLEM:

In old TV movies, all of us have seen the phenomenon where a spoked wagon wheel appears to move backwards. This is due to the 30 frames/sec sampling rate used in transmitting TV images. In the figure to the right, an eight-spoked wheel is shown. Assume that the wheel is rotating *clockwise at a constant speed* of 4 rev/sec.



- Write a rotating phasor formula for the observed movement of an individual spoke. This should be a continuous-time signal formula that depends on t (in sec).
- Given the sampling done by TV scanning, write a formula for the movement of an individual spoke as a function of the frame index n .
- Determine what a TV viewer will see, i.e., the observed rotation rate as a function of time t . Give your answer as the number of rotations per second and the direction of rotation.