PROBLEM:

In the rotating disk and strobe demo described in Chapter 4 of *SP-First,* we observed that different flashing rates of the strobe light would make the spot on the disk stand still.

(a) Assume that the disk is rotating in the counter-clockwise direction at a constant speed of 12 revolutions per second. Express the movement of the spot on the disk as a rotating complex exponential $e^{j\omega t}$ (a.k.a. a rotating phasor).

(b) If the strobe light can be flashed at a rate of n flashes *per second* where n is an integer greater than zero, determine all possible flashing rates such that the disk can be made to stand still.
NOTE: the only possible flashing rates are integers: 1 per second, 2 per second, 3 per second, etc.

(c) Now assume that the flashing rate is fixed, so that the interval between flashes is 100 millisec. Explain how the spot will move and write a complex phasor that gives the position of the spot at each flash.

(d) Draw a spectrum plot of the discrete-time signal in part (c) to explain your answer.