EEE 452/552

Due 21/05/2008

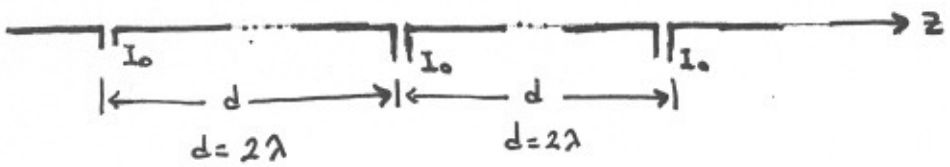
Homework # 13

(1) Question 6.21 on page 375 of your textbook.

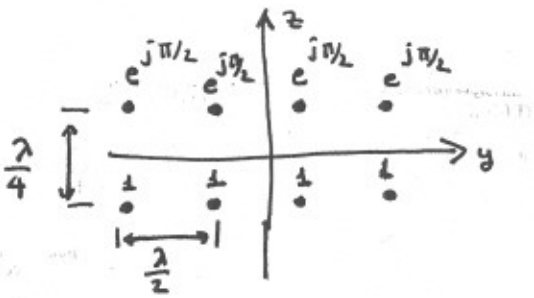
(2) Question 6.26 on page 375 of your textbook. (This question continues on page 376).

(3) question 6.76 on page 384 of your textbook.

(4) Consider an interferometer which is constructed from three collinear half-wave dipoles spaced 2 wavelengths apart as shown in the figure. Sketch the polar plot of the complete array pattern.



(5) The figure on the right shows a two-dimensional array of isotropic elements. The separation between the elements are $d_y = \lambda/2$ and $d_x = \lambda/4$. The array is excited in such a way that the 4 elements located at $z > 0$ are excited with $e^{j\pi/2}$ and the other 4 elements located at $z < 0$ are excited with 1.



(a) Find the magnitude of the normalized array factor by treating the pairs of elements oriented vertically as the "elements" of 4-element-array aligned in the y-direction. Plot it on the x-y, z-y and t-x cuts.

(b) Find the magnitude of the normalized array factor by treating the horizontal groups (4 elements) as the 'elements" of 2-element-array aligned in the z-direction.

(c) Drive the magnitude of the normalized array factor of the 2-D array shown on the right by using the array factor of the array in (a & b). Plot the magnitude of the normalized array factor on the x-y, z-y, and z-x cuts.