4.3 Field Distribution of Axial Surface Waves along a Coated, Electric Perfectly Conducting Cylinder

Because of the oscillatory behaviour of the Bessel functions J_n and Y_n, there will be m roots of equation (19) for any given n value. These roots are designated by β_{nm} and the corresponding modes are either TM_{0m}, TE_{0m}, EH_{nm} or HE_{nm} [4, p. 41-42].

As was already suggested towards the end of the previous section, TM and TE modes have no angular dependence, i.e. n=0.

The EH_{11} (or HE_{11}) mode is the fundamental mode; it has no low-frequency cutoff [6, p. 769].

Figure 4.2 shows the transverse electric field vectors in medium 1 for the four lowest order modes.

EH_{11} or HE_{11}

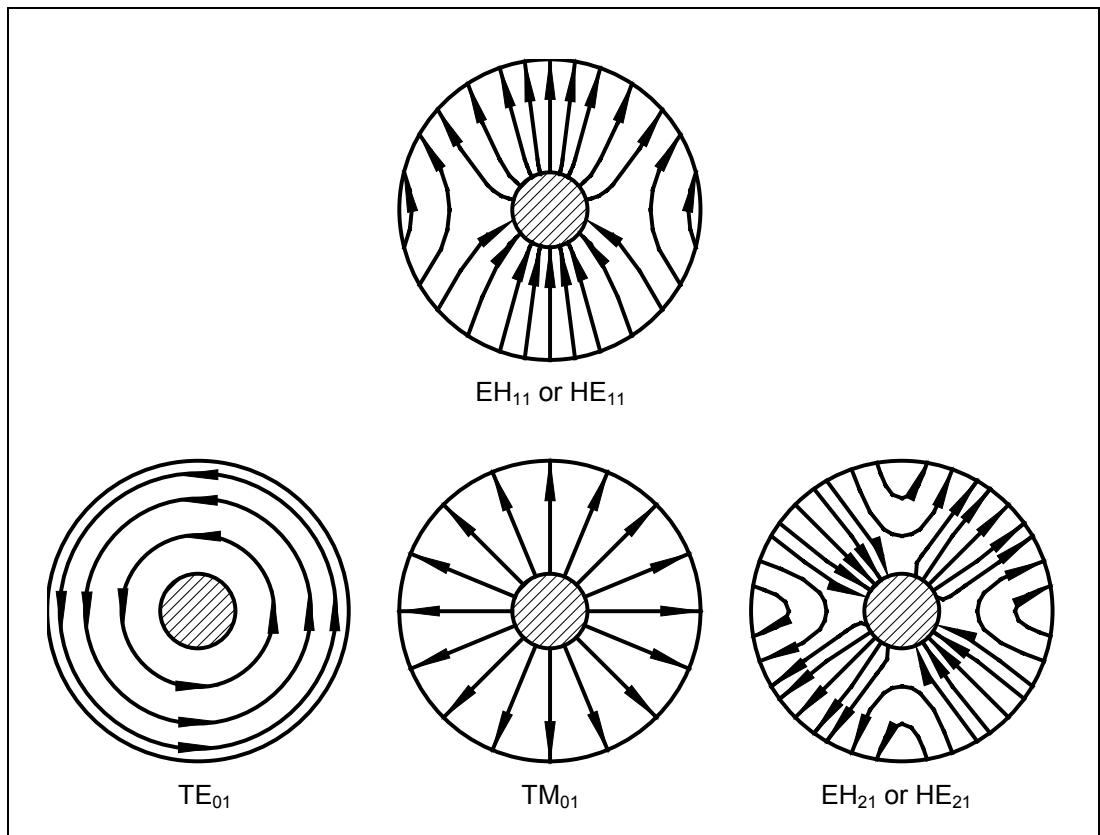TE_{01} TM_{01} EH_{21} or HE_{21}

Figure 4.2: The transverse electric field in medium 1 of the four lowest order modes