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## Reflection Coefficients on Surfaces of Different Periodic Structure

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### Abstract

Diffraction properties of lossy periodic gratings with the metal base were investigated by solving Maxwell's equations numerically using the differential method. Two periodic surfaces were employed in the simulation: triangle structure and tilting triangle structure. Based on the numerical solution and in conjunction with the algorithm of Adams-Moulton, we computed reflection coefficients of plane waves with different wavelengths and different incident angles. The dielectric properties were also explored using various dielectric constants. The results show that the reflection coefficients of both TE and TM waves are quite sensitive to the incident angles of the plane waves when the metal sheet exists, which is in good agreement with the experiment data.

Fig.1 Reflection coefficient changes with incident angle of light for tilting triangular structure(frequence:10GHZ,wave number:0) .

Fig.2 Reflection coefficient vs. different wavelength of light at the incident angle 30(degree) for tilting triangular structure( wave number:0).

Fig.3 Reflection coefficient changes with incident angle of light for triangular structure(frequence:30GHZ,wave number -1) .

Fig.4 Reflection coefficient vs. different wavelength of light at the incident angle 30(degree) for triangular structure(wave number -1)).

Fig.5 Reflection coefficient changes with incident angle of light for triangular structure(frequence:10GHZ, wave number -1) .

Fig.6 Reflection coefficient vs. different wavelength of light at the incident angle 30(degree) for triangular structure( wave number -1).

Fig.7 Reflection coefficient changes with incident angle of light for triangular structure of lossless material(frequence:10GHZ, wave number -1) .

Fig.8 Reflection coefficient changes with incident angle of light for triangular structure of lossless material(frequence:10GHZ, wave number 0) .

Fig.9 Reflection coefficient changes with incident angle of light for triangular structure of lossy material without metal base .

Tilting triangular structure

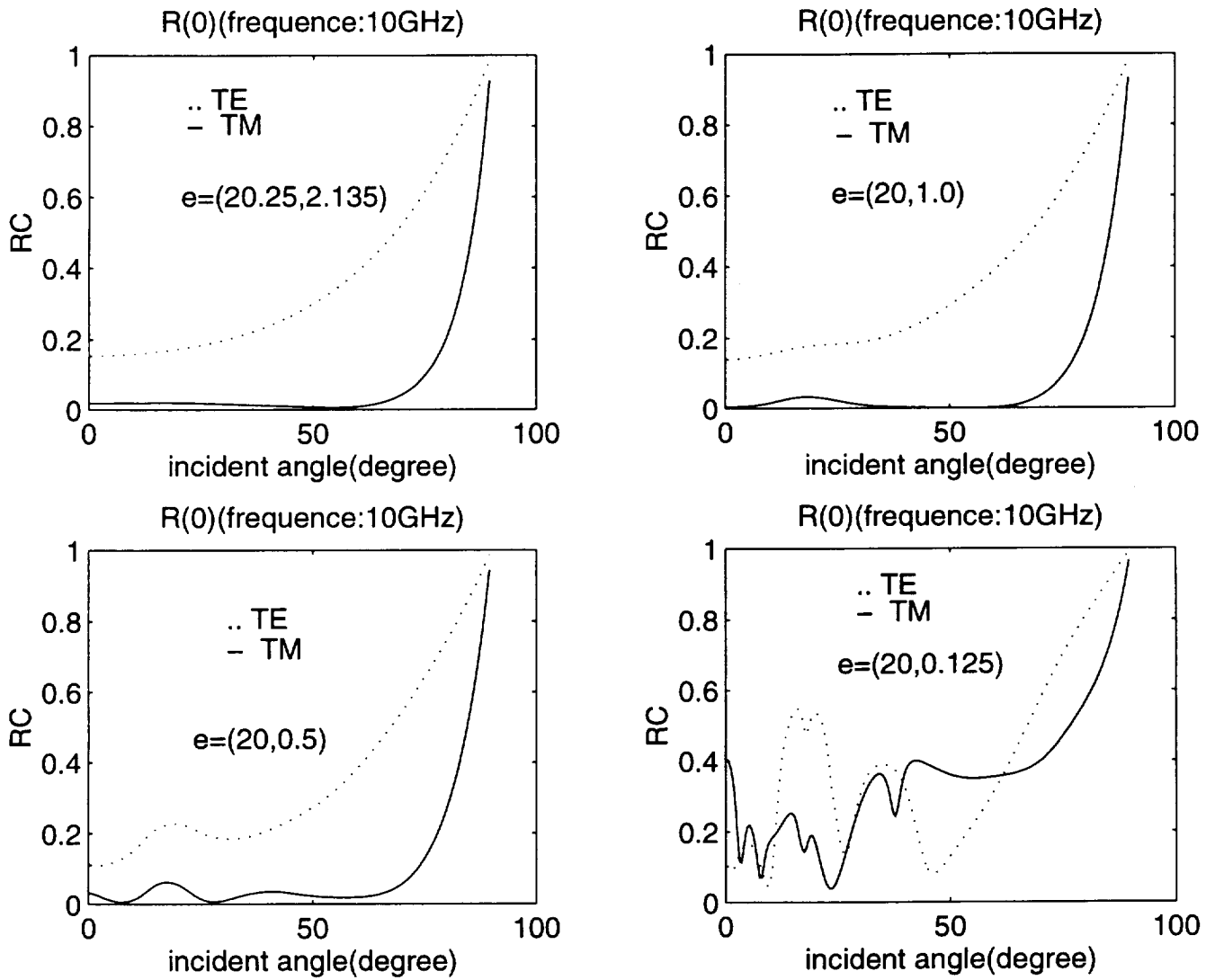


Fig. 1

Tilted triangular structure

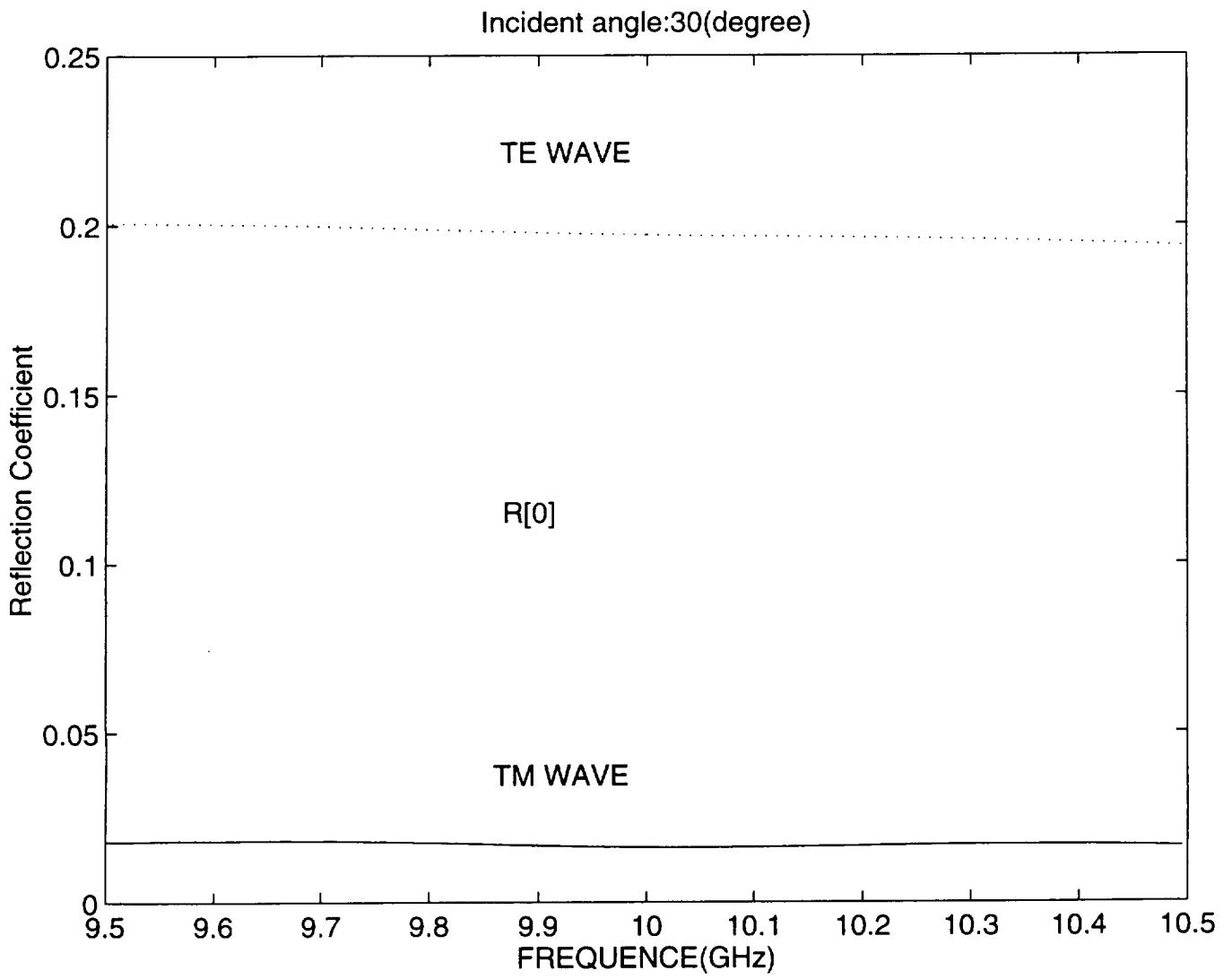


Fig.2

Triangular structure

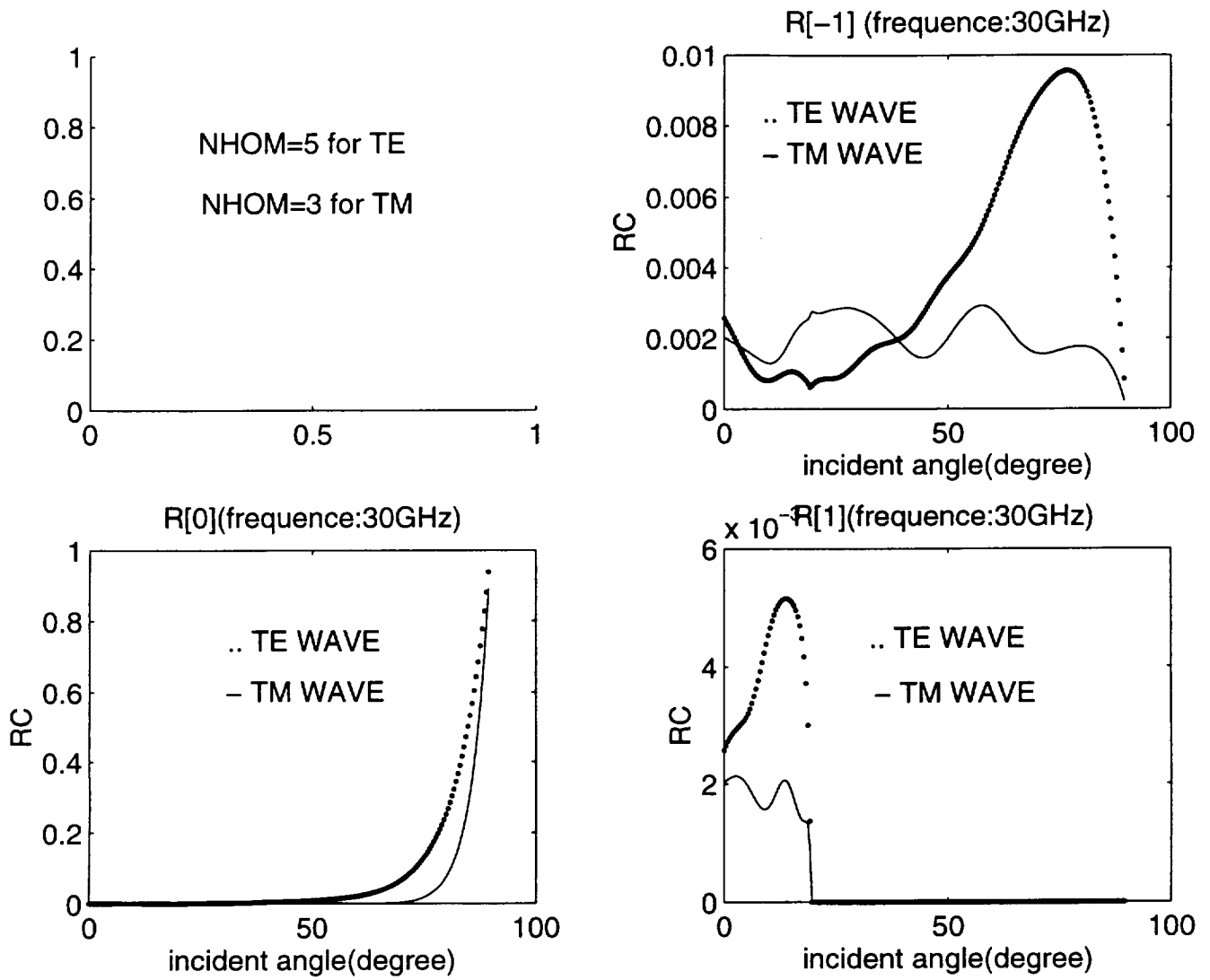


Fig.3

Triangular structure

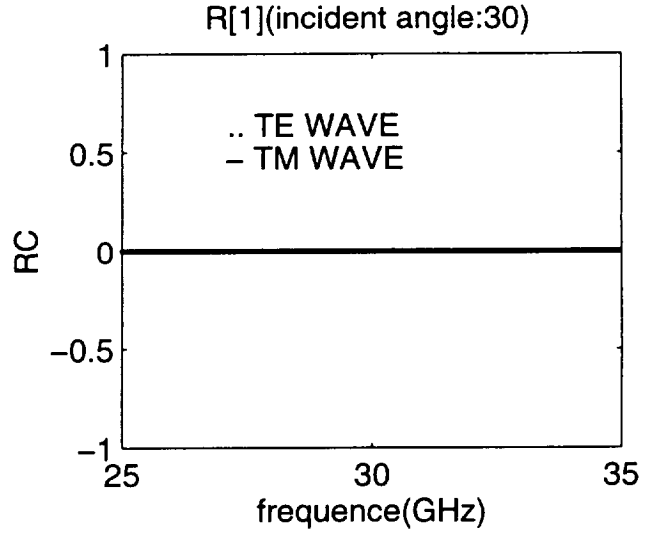
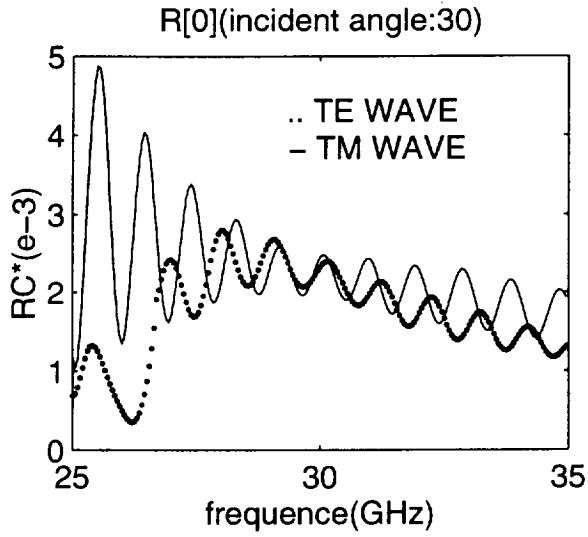
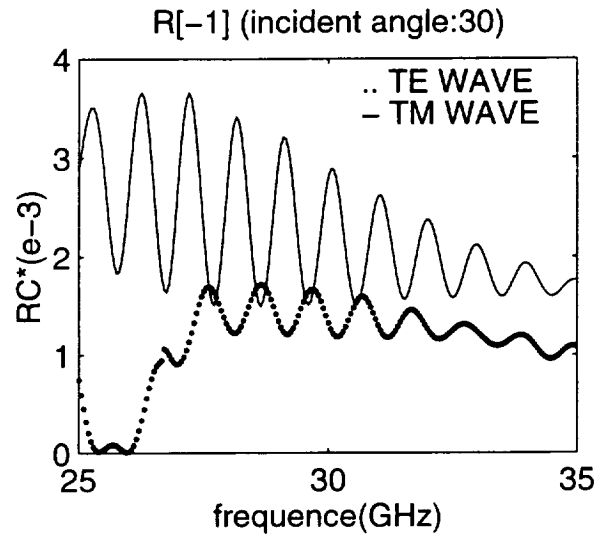
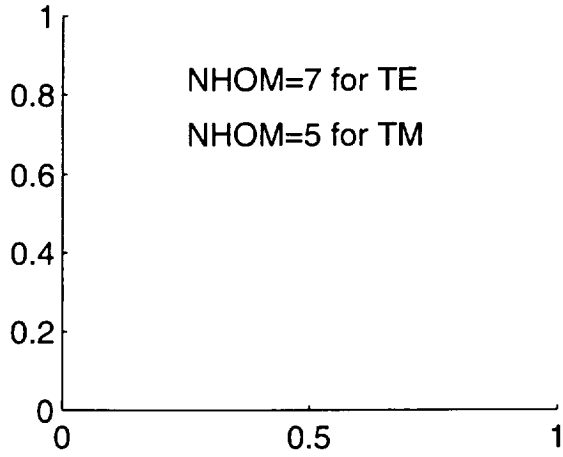


Fig. 4

Triangular structure

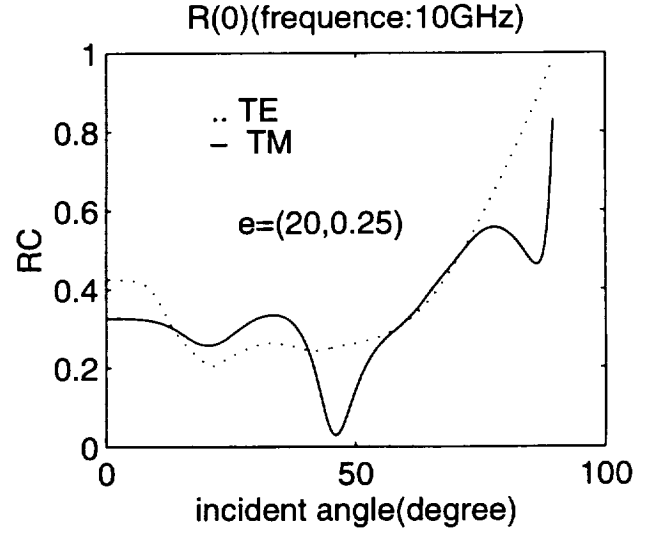
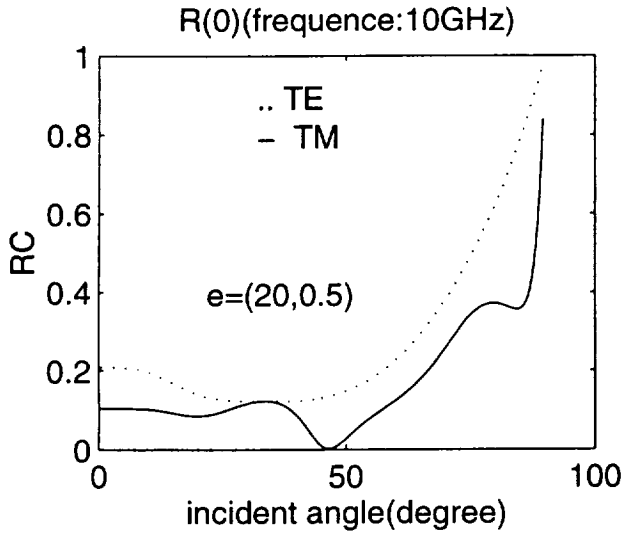
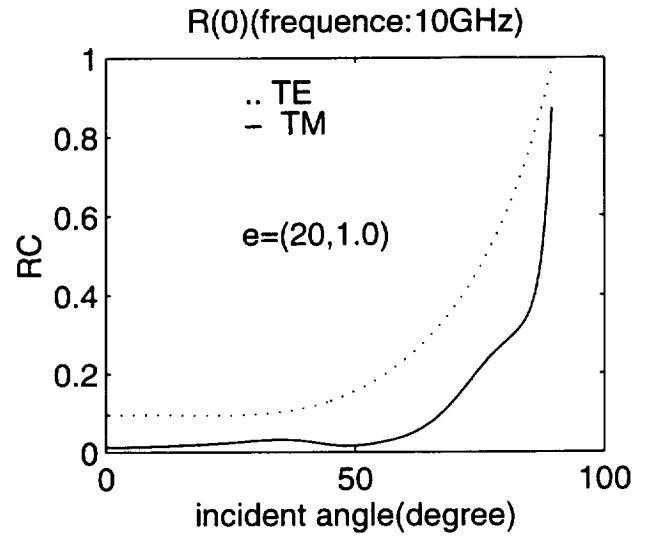
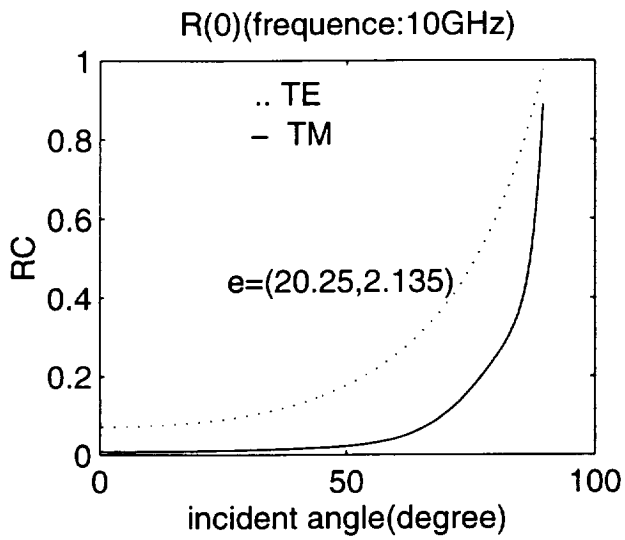


Fig.5

Triangular structure

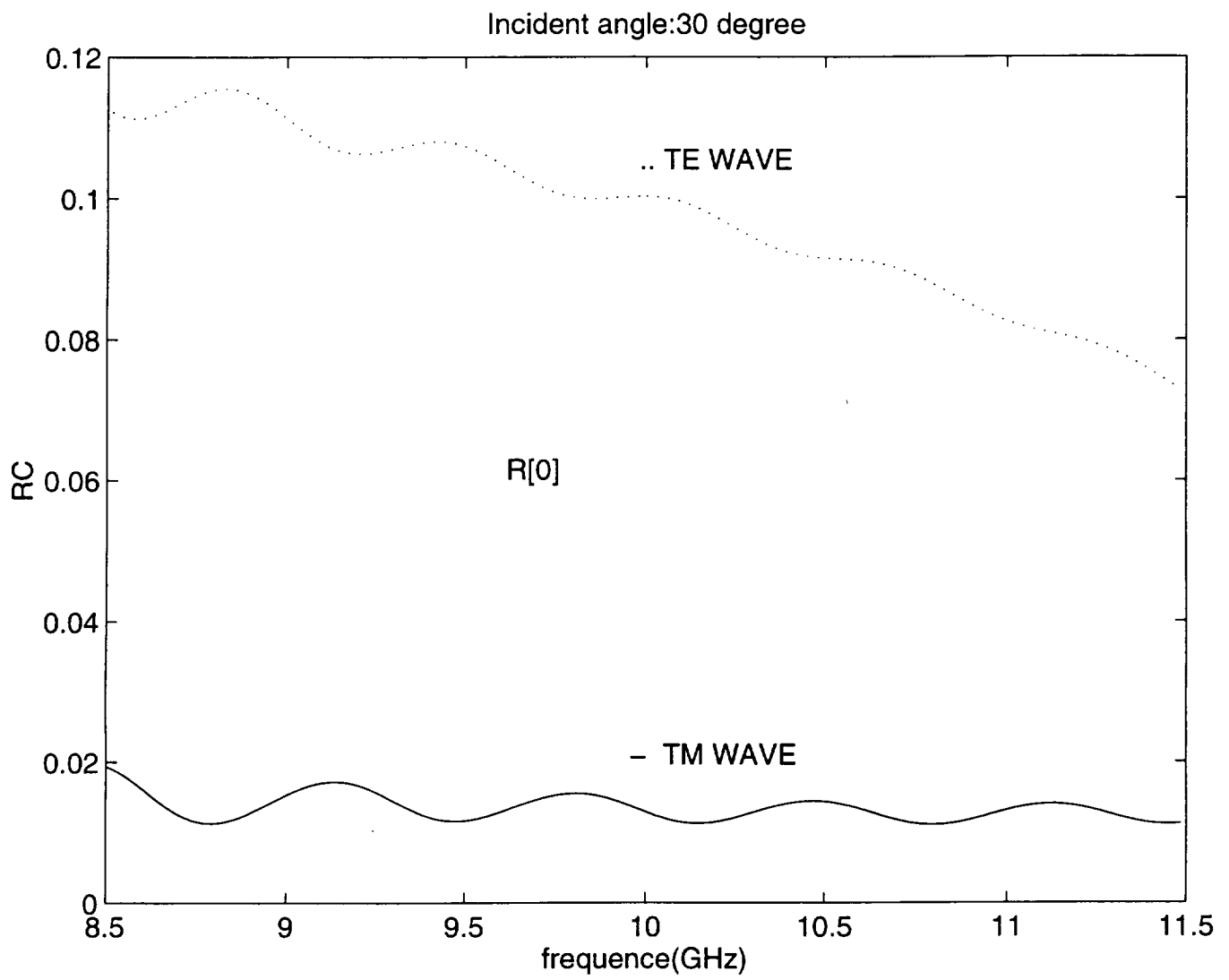


Fig. 6



Triangular structure

Freq. 10GHz

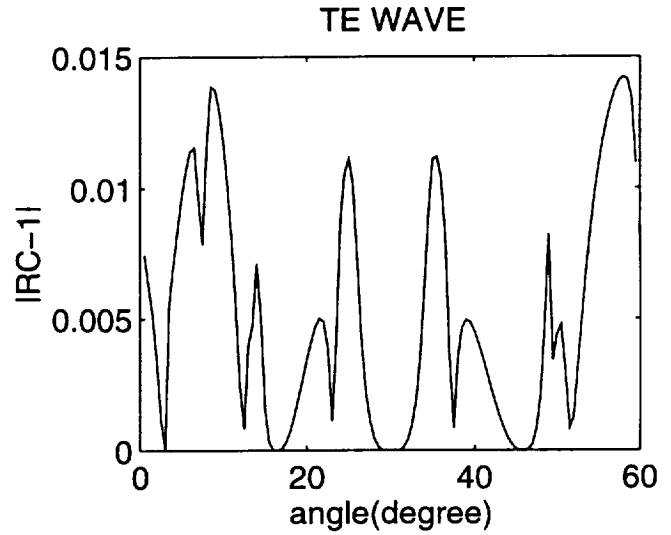
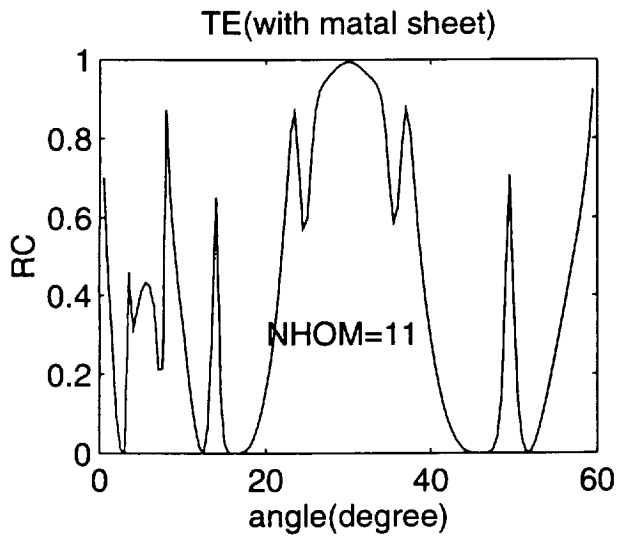
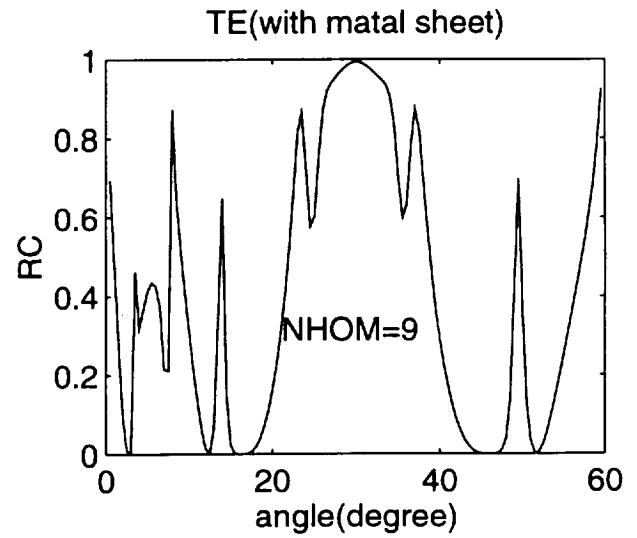
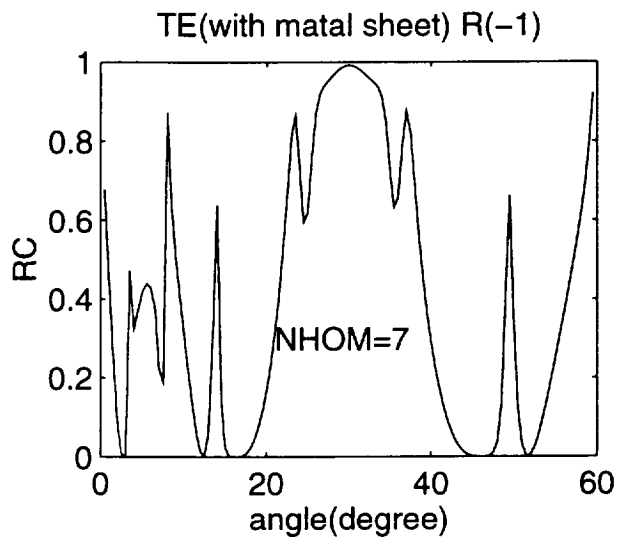


Fig. 7

Triangular structure

Freq. 10GHz

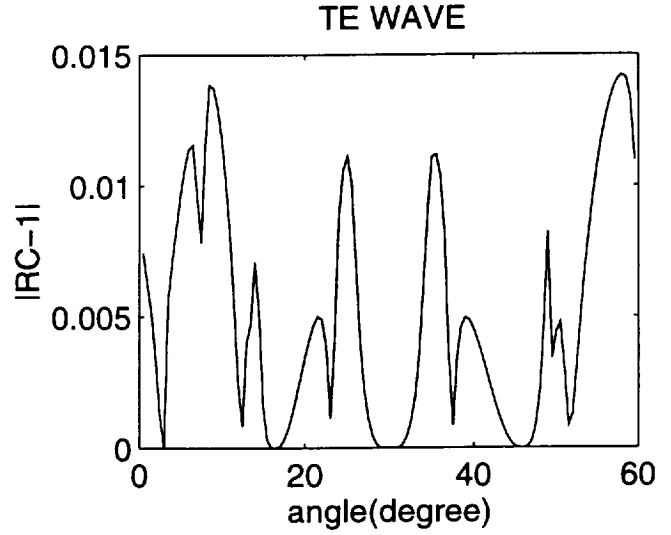
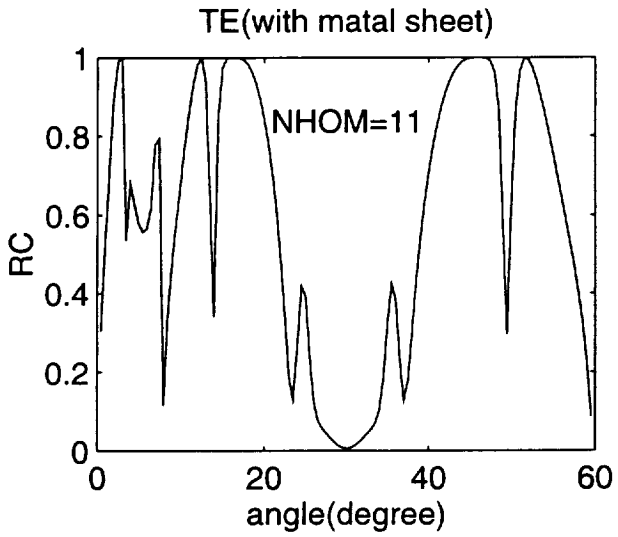
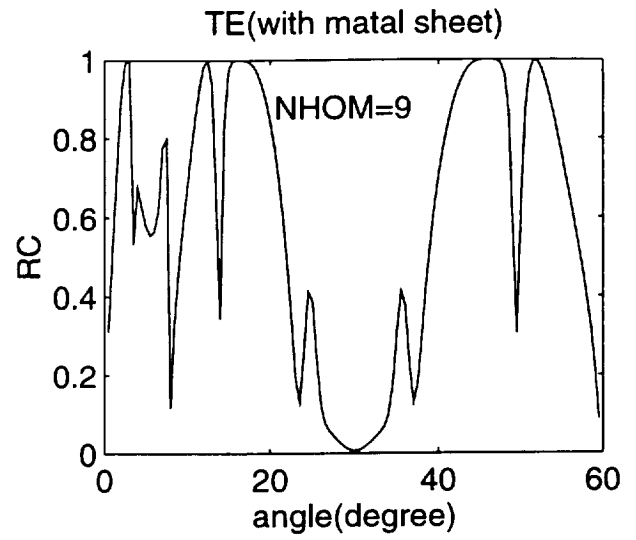
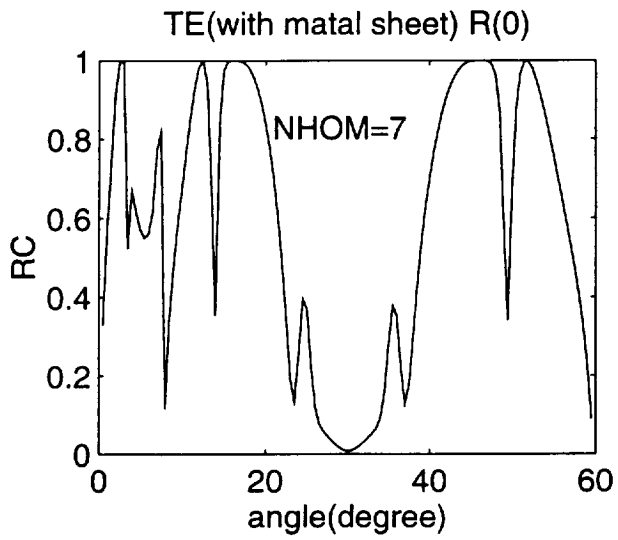


Fig. 8

Triangular structure

Freq 10GHz

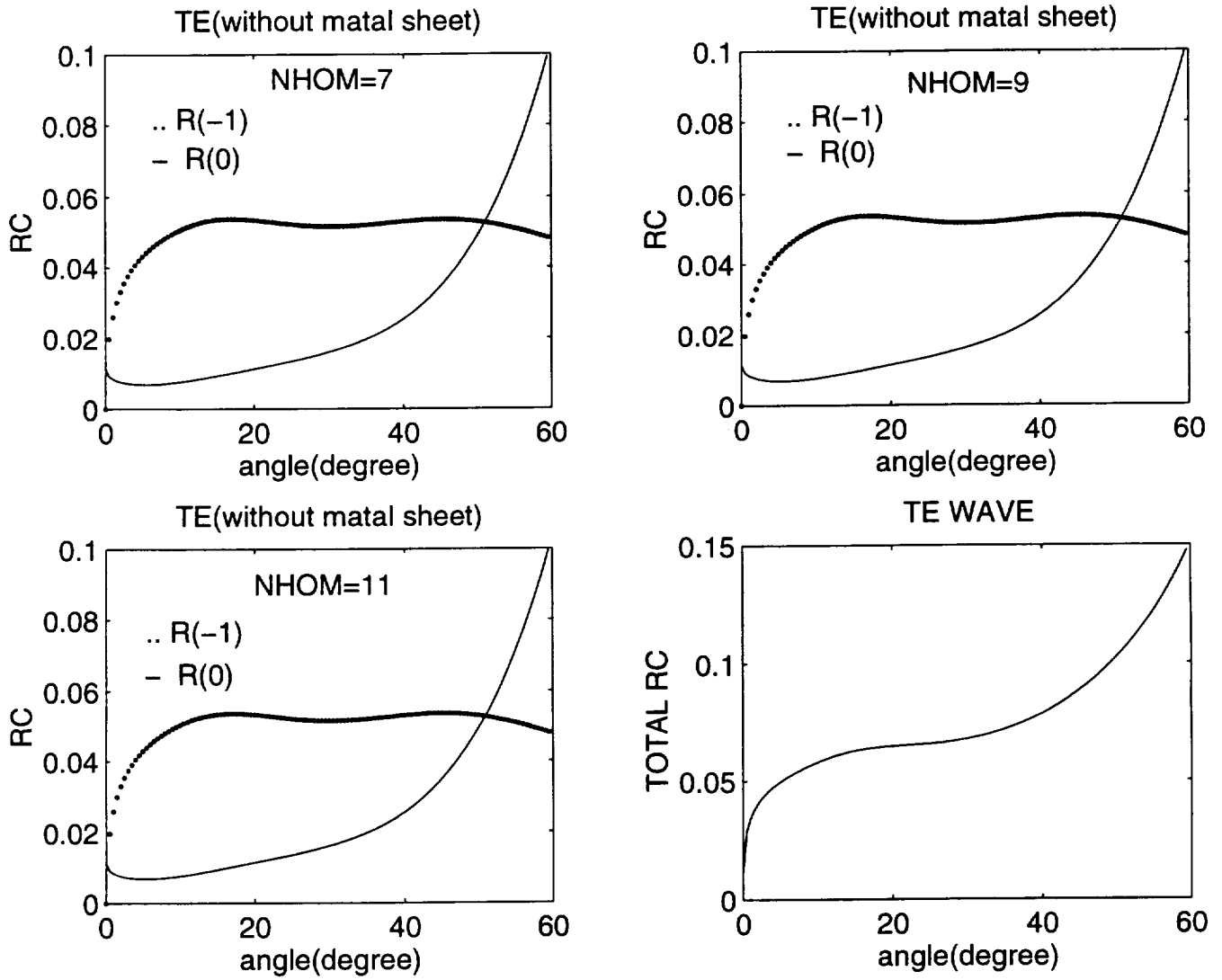


Fig. 9