

Exercise 4

- a. There are 81 elements for the Cartesian components
 $\omega_4 = \omega_1 + \omega_2 + \omega_3 \rightarrow 3! \text{ combinations per frequency} = 6$
 4 frequencies

2 up and down



$$81 \times 48 = 3888$$

- b. $\times \frac{1}{2}$ we drop the negative frequencies
- c. If the material is lossless all frequency components appear with the same efficiency $\Rightarrow 81$
 $\{ 81 \times 4 \text{ could be too but } \chi(\omega_4) = \chi(\omega_1) \text{ if the response is a product of the other components} \}$

d. 15	XXXX	}	3	4,0
	YYYY			
	ZZZZ			
	EXXX	}	6	3,1
	YXXX			
	XXYY			
	ZYYY			
	YYZZ			
	XZZZ			
	XXYY	}	3	2,2
	XXZZ			
	YYZZ			
	XXYZ	}	3	2,1,1
	YXYZ			
	ZXYZ			

This means that all freq components respond