# SUMMARY

# SUMMARY

The objective of this thesis, which consists of five chapters is to study some problems in non-linear oscillations, which governed by sets of two-coupled-second order non-linear differential equations. The study is focused on :

1-Finding an approximate solutions in the presence of resonance conditions by using one of the perturbation methods.

2-Finding the steady state solutions (periodic solutions).

3-Determining the fixed points (equilibrium points) of the modulations equations.

4-Examining the stability of the steady state solutions.

Chapter one is devoted to study, sub-harmonic and super-harmonic resonances in the presence of internal (autoparametric) resonance of type (two-to-one) and (one-to-two), to the forced oscillations of two degree of freedom system with quadratic non-linearities.

Chapter two is concerned with the principal parametric resonances of the first and the second mode in the presence of internal resonance (two-to-one ) and (one-to-two), for two internal resonant oscillators with quadratic non-linearities subjected to quadratic parametric excitation.

In chapter three , the principal parametric resonance of the second mode and combination parametric resonance of the additive type in the presence of internal resonance (two-to-one) and (one-to-two) are investigated for two internal resonant oscillators, subjected to combined parametric and external excitation of the same frequency.

In chapter four, harmonic, sub-harmonic and super-harmonic resonances of non-linear system provided with non-linear vibration absorber are determined.

In chapter five the problem of the steady state behavior of systems provided with non-linear dynamic vibration absorber is considered.

The theoretical results are obtained by the multiple scales method in the first three chapters, the multiple dimension method in the forth chapter and averaging method in the fifth chapter. Numerical results are plotted in group of Figures, their discussion are given.