

Table of Contents

Introduction	1
Chapter 1 Existence and properties of solutions	
1. Local and global existence	5
2. Applications:	
A. $u_{tt} - \Delta u + m^2 u = -\lambda u ^{p-1} u$, $n = 3$, $p = 3$	11
B. The case $m = 0$	19
C. Other p , n and λ	20
D. The sine-Gordon equation	25
E. An example where global existence fails	29
F. The coupled Dirac and Klein-Gordon equations	33
3. Smoothness of solutions	40
4. Finite propagation speed and continuous dependence on the data	49
5. Weak solutions	56
6. Discussion	64
Chapter 2 Scattering theory	
7. Formulation of scattering problems	67
8. Scattering for small data	71
9. Global existence for small data	88
10. Existence of the wave operators	90

11. Applications:	
A. The non-linear Schrödinger equation	94
B. $u_{tt} - u_{xx} + m^2u = \lambda u^p$, $n = 1$	96
C. $u_{tt} - \Delta u + m^2u = \lambda u^p$, $n = 3$	102
D. The coupled Dirac and Klein-Gordon equations	105
12. Asymptotic completeness	110
13. Discussion	121
Bibliography	125