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ON NONLINEAR SCHRÖDINGER EQUATIONS

The spatially one dimensional initial boundary value problem for the coupled nonlinear Schrödinger and wave equation serves as a model for certain cases of nonlinear interaction between a plasma layer and an incident electromagnetic field. We deal with the problem as a system of operator differential equations in the space of square integrable functions on the unit interval. Local existence, uniqueness and certain continuity properties of solutions are proved. Moreover, a modified Galerkin method has been established which is used for the numerical treatment of the stated problem in combination with time discretization. Examples concerning the above mentioned physical problem are given as illustration. In the same way as the original problem we treat a similar one containing an additional damping term in the nonlinear wave equation. The solution theory is less difficult in that case and one arrives at a global existence result and better convergence of Galerkin's method.

REFERENCES

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