

### **Chaos and predictability; applications**

Simona Dontu, D. Savastru, M.Ciobanu

National Institute of R&D for Optoelectronics INOE 2000, Atomistilor 1, Bucharest - Măgurele,  
Postal Code 077125, Romania, simona@inoe.inoe.ro

Chaos fundamentals and the problems of stability analysis are presented. A predictability investigation is performed for the four - level laser in the case of periodic pump term. Finally, maximum Lyapunov exponents are calculated for this case. Chaos is evidenced at the same threshold value of pump frequency by two ways, namely by a sudden decrease in the error – doubling time (computed via the Kolmogorov entropy) and by the change in sign of the maximum Lyapunov exponent.

**Key words:** correlation dimension, error doubling time, Lyapunov exponents, predictability.