Universität Erlangen-Nürnberg
Naturwissenschaftliche Fakultät I
Wintersemester 2003/2004
Prof. Dr. K. Klamroth
Barbara Pfeiffer

22. 01. 2004

Integer and Nonlinear Optimization
Exercise 13

Problem 1 (6 points)
Prove the following estimation formulas for the required number n of function evaluations for the respective line search methods.

(a) Uniform Search : $n \geq \frac{b_1 - a_1}{l/2} - 1$

(b) Dichotomous Search : $(2)^{\frac{n}{2}} \geq \frac{b_1 - a_1}{l}$

(c) Golden Section Search : $\left(\frac{2}{\sqrt{5}-1}\right)^{n-1} \geq \frac{b_1 - a_1}{l}$.

Problem 2 (18 points)
Implement each of the following algorithms in Matlab and submit the ***running*** programs.

(a) Dichotomous search method

(b) Golden section method

(c) Fibonacci search method

(d) Newton's method.

Find the minimum of $e^{-\lambda} + \lambda^2$ by each of the four procedures.