STAT 454/556 Statistical Computing **Assignment 2 (28 marks)**

1. (6 marks) Read the 2 papers on simulated annealing found on the course webpage and mentioned in class. Write a short 1 paragraph **1 page or less** summary for each paper. Try to be clear and concise without plagiarizing the authors.

2. (5 marks) Let $\mathbf{u} = (-1, -0.7, -0.5, -0.2, 0, 0.2, 0.5, 0.7, 1)$, and $\mathbf{n} = (n(1), n(2), ..., n(9))$. Define

$$A = \frac{1}{18} \sum_{i=1}^{9} n(i) \begin{pmatrix} 1 \\ u(i) \\ u(i)^2 \end{pmatrix} \begin{pmatrix} 1 & u(i) & u(i)^2 \end{pmatrix} \tag{1}$$

   and $f(\mathbf{n}) = -det(A)$.

   Minimize $f(\mathbf{n})$ subject to $n(1), n(2), ..., n(9)$ are nonnegative integers, and $\sum_{i=1}^{9} n(i) = 18$.

3. (5 marks) Let $f(x) = e^{-\frac{x}{4}} cos(2x)$, $x > 0$. Use simulated annealing to minimize $f(x)$ subject to $x \in (0, 10)$.

4. (a. 2 marks, b. 2 marks, c. 4 marks, d. 2 marks, e. 2 marks) Exercise 3.4 in Text.