Risk analysis lab 2014. 09. 29. (Markov bound)

1. Implement the followings into `convolution.m`:

   a) With given $p_l^{(j)} := P\left(X_j = l\right), \quad j = 1, \ldots, J$ distributions and C, calculate $P\left(\sum_{j=1}^{J} X_j > C\right)$ using convolution.

   - For the sake of simplicity, let's assume that $l = 1, \ldots, L$, ie. the domain corresponds to the vector indices, therefore p is represented as a JxL matrix.
   - The p.d.f. of the sum of two independent random variables is the convolution of their p.d.f.-s; use the `conv` command pairwise to obtain the distribution of $\sum_{j=1}^{J} X_j$.
   - Note that the domain of their convolution will be $l = J, \ldots, JL$.

   b) Plot the $p^{(j)}$ distributions on figure 1, and plot their convolution on figure 2.

2. Calculate an upper bound for the probability using the Markov inequality

$$P\left(\sum_{j=1}^{J} X_j > C\right) \leq \frac{\sum_{j=1}^{J} m_j}{C} \quad ,$$

   where m_j is the expected value of the jth random variable. Use `markov.m` to place code into. (Although the formula allows it, take care of probabilities being bigger than one.)