Cryptography: Homework 4

(Deadline: October 25, 2018)

1. (20 points) Let $f(n), g(n)$ be negligible functions and let $p(n)$ be a polynomial function. Show that $f(n) + g(n)$ and $p(n)f(n)$ are negligible functions.

2. (30 points) Let X, Y, Z be random variables over $S = \{0,1\}^n$ (i.e., X, Y, Z take values in S). Let $f : S \to S$ be any function. Show that

   - $\mathrm{SD}(f(X), f(Y)) \leq \mathrm{SD}(X, Y)$;
   - $\mathrm{SD}(X, Z) \leq \mathrm{SD}(X, Y) + \mathrm{SD}(Y, Z)$.