Signal and System

CHEN DING-SHAN

def. **Signal**
x is a Signal $\iff x \in A^B$ where A, B is sets, or it can be represented by x is a function, $f : B \to A$.
anno. the elements of A^B *is functions* $f : B \to A$.
def. **System**
x is a System $\iff x \in \left(A^B\right)^{\left(A^B\right)}$ where A, B is sets.
def. **continuous time signal**
x is continuous time signal $\iff x \in A^R$ where A is a set.
def. **discrete time signal**
x is discrete time signal $\iff x \in A^Z$ where A is a set.
at this scope, the codomain is typically R, e.g., a continuous time signal is a element in R^R.
oper. **addition** of **signal**
prer. The domain A and codomain B of two signals, f, g, is the same, and B has addition operation.
The addition of the two signal is $f + g$ generated by the equaltion $(\forall x)[(x \in A) \to ((f + g)(x) = f(x) + g(x))]$.
oper. **scaling** of **signal**
prer. The codomain B of the signal f has scaling operation with scaling factor in the sets C.
The scaling of f with factor a is af generated by the equation $(\forall x)[(x \in A) \to ((af)(x) = a(f(x)))]$.