

## The code length for arithmetic coding

- ▶ Given  $m$  bits of binary expansion we assume the rest are all zero.
- ▶ Distance between two  $m$  bit expansions is  $2^{-m}$
- ▶ If  $l_T - u_T \geq 2^{-m}$  then there must be a point  $x$  described by  $m$  expansion bits such that  $l_T \leq x < u_T$
- ▶ Required number of bits is  $\lceil -\log_2(u_T - l_T) \rceil$ .