

ω -Regular Expressions and LTL Properties

1. An A is followed by B 's ad-infinitum or until a C .

$$\omega\text{-RegE: } A \cdot (B^\omega + B^* \cdot C \cdot (A+B+C)^\omega)$$

$$\text{LTL: } A \wedge X(\Box B \vee (BUC))$$

2. Between any two neighboring A 's there is at least one B .

$$\omega\text{-RE: } (B+C)^\omega + (B+C)^* A (B+C)^\omega + (B+C)^* [A \cdot (B+C)^* \cdot B \cdot (B+C)^* + B+C]^\omega$$

$$\text{LTL: } [\Box(\neg A)] \vee [\Box(A \Rightarrow X\Box\neg A)] \vee [A \Box (A \wedge X(\neg A \vee A)) \Rightarrow X(\neg A \wedge \neg B) \vee B]$$

3. Never is it that an A is followed by a B unless the A is preceded by a C .

$$\omega\text{-RE: } (B+C + A^+C + C \cdot A \cdot B)^\omega$$

$$\text{LTL: } \neg(A \wedge XB) \wedge \Box(XA \wedge XXB \Rightarrow C)$$

4. If an A occurs and within the next three symbols a B occurs then after the B , in 2 symbols a C occurs.

$$\omega\text{RE: } [A \cdot (A+C+E) \cdot (A+C+E) \cdot B \cdot (C + (B + A \cdot C \cdot C) \cdot C) + B+C+A \cdot C \cdot C \cdot C]^\omega$$

$$\text{LTL: } \Box[A \wedge [XB] \Rightarrow XXX(C \vee XC)] \wedge [(A \wedge \neg XB \wedge XXB) \Rightarrow XXX(C \vee XC)] \wedge$$

$$[(A \wedge \neg X(B \vee XB) \wedge XXXB) \Rightarrow XXXX(C \vee XC)]$$

5. If an A occurs and is thereafter followed at sometime by a B , then eventually thereafter a C occurs.

$$\omega\text{-RE: } (B+C)^* \cdot A \cdot (A+C)^\omega + [B+C + A \cdot (A+C)^* \cdot B \cdot (A+B+C)^* \cdot C]^\omega$$

$$\text{LTL: } \Box A \Rightarrow X(\neg B \vee [B \Rightarrow X\Diamond C])$$