

Pseudocode for the identification of firing pattern elements

```
(i)   If HAS_DELAY(): add D.

(ii)  If HAS_TSTUT():
      If swa > MIN_SWA: add TSWB.
      Else: add TSTUT.

(iii) RUN_SOLVER_STAT_TESTS()

(iv)  If STEADY_STATE_FIRING:
      If HAS_PSTUT():
          If swa > MIN_SWA: add PSWB
      Else: add PSTUT

(v)   IF HAS_SLN(): add SLN
```

Function definitions:

```
HAS_DELAY()
    IF fsl > DELAY_FACTOR * ISI_AVG(1,2):
        Return TRUE
    ELSE:
        Return FALSE

HAS_TSTUT()
    For ISIs i = 2, 3 and 4:
        IF      ISII > ISII-1 * TSTUT_PRE_FACTOR &&
           ISII > ISII+1 * TSTUT_POST_FACTOR &&
           Avg(ISII:n) > Avg(ISI1:i-1) * TSTUT_PRE_FACTOR &&
           Freq(ISI1:i-1) > MIN_TSTUT_FREQ
            Return TRUE
    IF      pss > ISIn * TSTUT_PRE_FACTOR &&
       Freq(ISI1:n) > MIN_TSTUT_FREQ &&
       swa > MIN_SWA
        Return TRUE

RUN_SOLVER_STAT_TESTS()
    Fit ISIs against their latencies using 1 parameter (Y=c0), 2 parameter
    (Y=m1X+c1), 3 parameter (Y=m2X+c2, Y=c3) and 4 parameter (Y=m4X+c4,
    Y=m5X+c5) piecewise linear fits

    IF NOT significant improvement from 1 parm to 2 parm linear fit:
        Add NASP/STEADY_STATE
        Return
    IF NOT significant improvement from 2 parm to 3 parm linear fit:
        IF slope > SLOPE_THRESHOLD:
            Add ASP.
        ELSE:
            Add NASP
        Return
    IF NOT significant improvement from 3 parm to 4 parm linear fit:
        Add ASP.
        Add NASP
        Return
    Add ASP.
    Add ASP.
```

```

Return

HAS_PSTUT()
    ISII = maximum of ISIs
    factor_1 = ISII/ISII-1
    factor_2 = ISII/ISII+1
    IF factor_1 + factor_2 > PSTUT_FACTOR
        Return TRUE

HAS_SLN()
    IF    pss > SLN_FACTOR * ISI_AVG(n,n-1) &&
        pss > SLN_FACTOR * ISI_MAX:
        Return TRUE

    ELSE:
        Return FALSE

```

Abbreviations

ISI: inter spike interval, *fsl*: first spike latency, *pss*: post spike silence, *swa*: slow after hyperpolarizing wave amplitude.

Constants: MIN_SWA = 5mV, DELAY_FACTOR = 2, SLN_FACTOR = 2,
TSTUT_PRE_FACTOR=2.5, TSTUT_POST_FACTOR=1.5, PSTUT_FACTOR = 5,
SLOPE_THRESHOLD=0.003, MIN_TSTUT_FREQ = 25Hz