WHAT IS SEASONALITY?

- PATTERN WITHIN A YEAR
- OBSERVABLE OVER MORE YEARS
- VARIABILITY ACROSS SEASONS
- SIMILAR INTENSITY ⎫
- USUAL PATTERN ⎬ LONGER PERIOD OF TIME
- SOME REFERENCE PERIOD REQUIRED → SUFFICIENT
- CYCLES → START + END
  → FREQUENCY

SEASONAL OR NOT?

	g1	g2	g3	g4	g5
1	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓
3	✗	✗	✗	✗	✗
4	✓	✓	✓	✗	✗
5	✗	✗	✗	✗	✗
6	✓	✓	✓	✓	✓
#	5	5	5	6	6

TIEBREAKERS

	G1	G2	G3	G4	G5
Computation time	6 moch	2d	5min	1w	2w
Associated costs	10k	100	1000	100	5-10k

STABLE

$$S_t - S_{t-12} = 0$$

UR

$$S_t - S_{t-12} = \varepsilon_t \; ; \; E(\varepsilon_t) = 0$$
$$(1 - B^R) S_t = \varepsilon_t$$

Dynamic

$$(1 - \phi B^R) = \varepsilon_t$$
$$|\phi| < 1$$

PRETREATMENT

$$DATA = DET. VAR! \times ST. VAR.$$

DET. VAR! → OTL, ST. CAL.VAR

ST. VAR. → TC, SEAS, IRR

$$Y_t = \sum_R \beta_R x_{R,t} + \xi_t$$

non-par: regARIMA

param.: TRAMO

SA X-11/13 SEATS

X-11 principle

$$\varepsilon_t = \boxed{t_t} + S_t + i_t$$

① $\quad \downarrow \nearrow \swarrow LF ?$

$\hat{t}_t$

② $\varepsilon_t - \hat{t}_t = \boxed{S_t} + i_t = (si)_t$

③ $\quad \downarrow \nearrow \swarrow LF ?$

$\hat{s}_t$

④ $\varepsilon_t - \hat{S}_t \longrightarrow \hat{\varepsilon}_t \quad \nearrow (\hat{s}_t)$

X-11 modes

add : $\Sigma_t = t_t + S_t + i_t$

mult : $\Sigma_t = t_t \times S_t \times i_t$

log-add : $\log(\Sigma_t) = t_t + S_t + i_t$

ps.-add : for zero obs

$\downarrow$

— add. on not-zeros
— mult. on zeros

OBS

TC   + LS
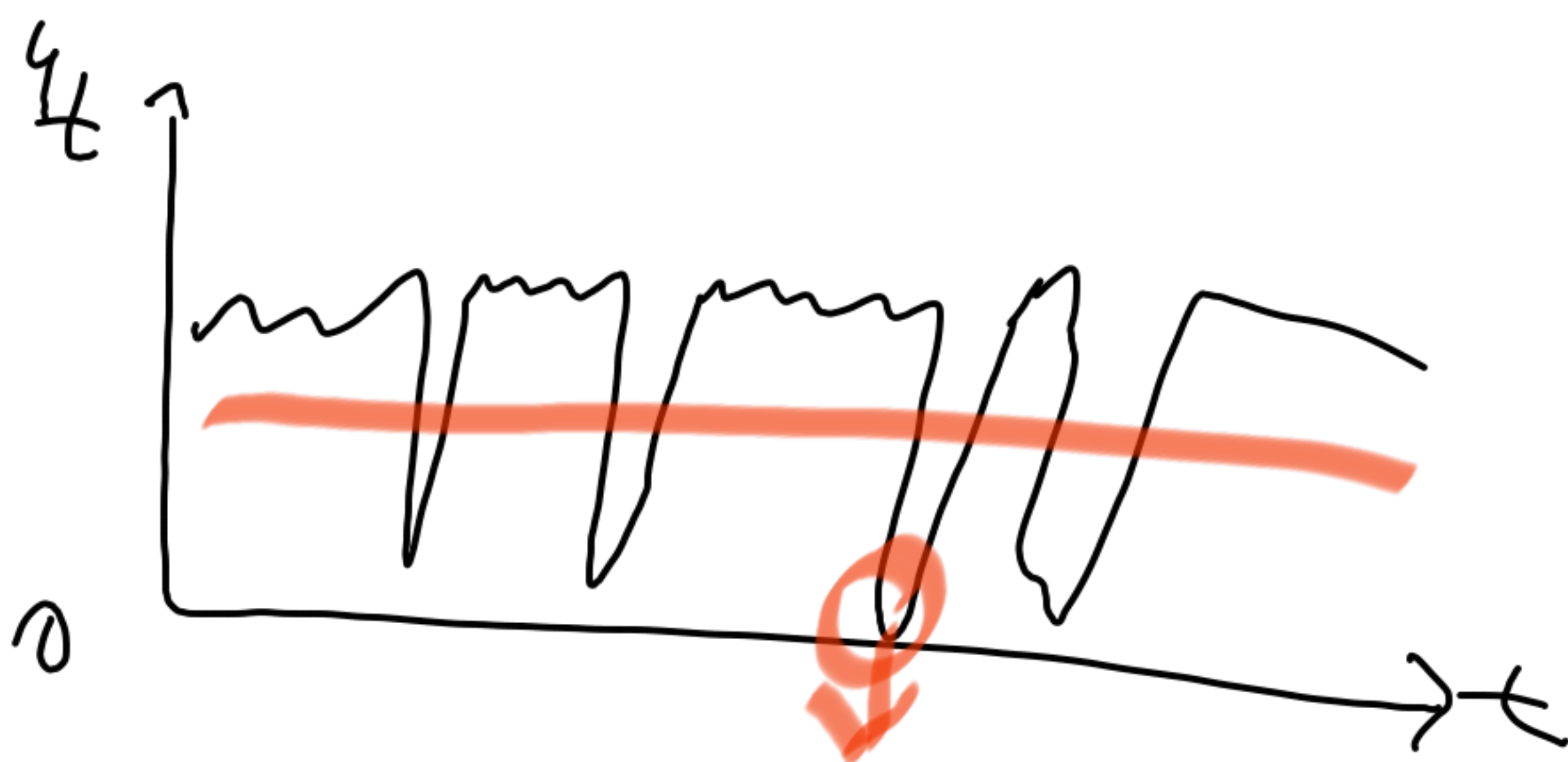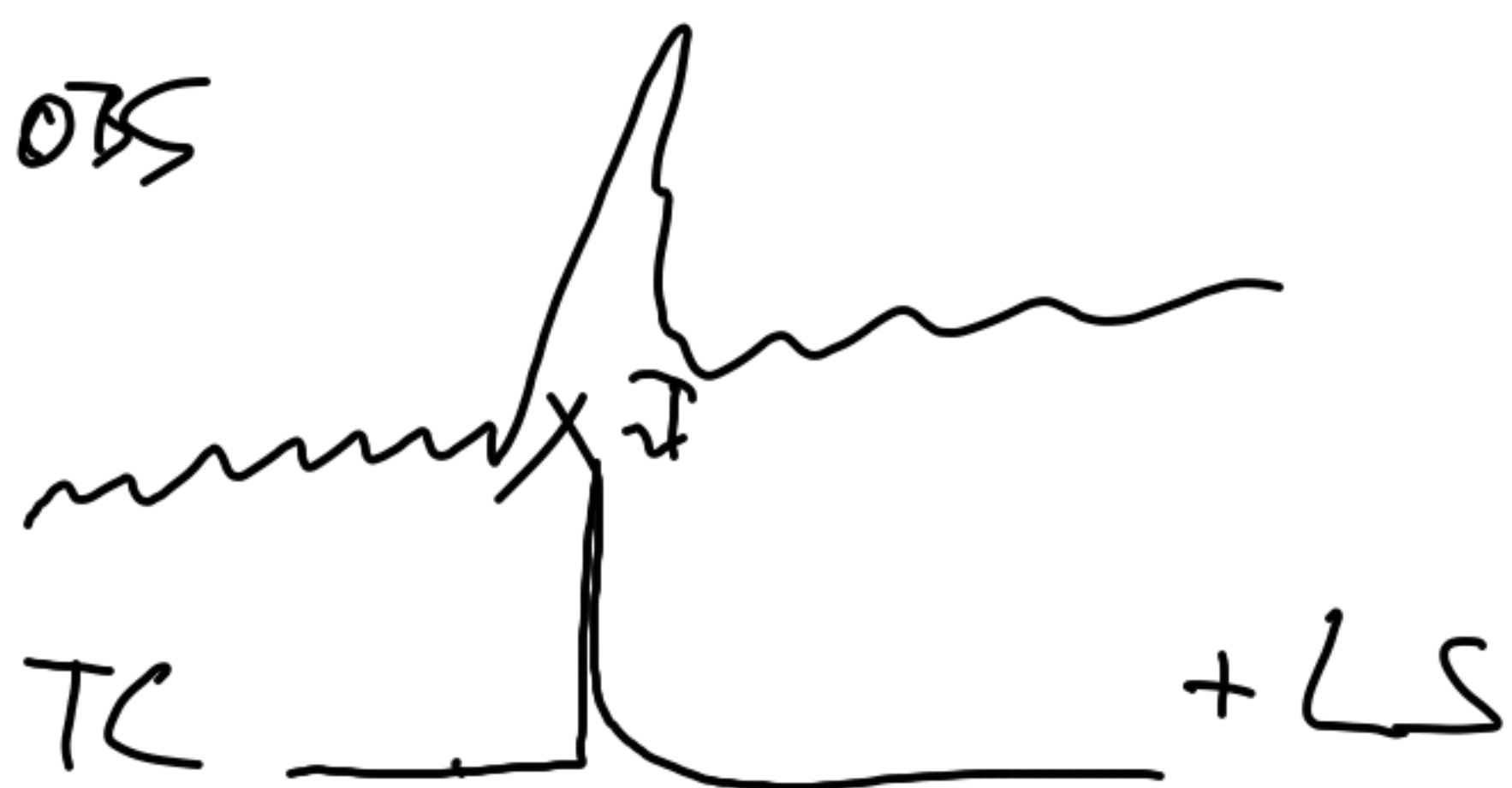
SEATS (Airline)

$$(1-B)(1-B^4) = (1-\Theta B) \ldots$$
$$(1-B)(1-B)(1+B+B^2+B^3)$$
$$(1-B)^2(1+B+B^2+B^3)$$

B-M

TC

$\neg 1, i, -i$

JM

RAS

$$P \Theta = 1$$

$$P \Theta = \frac{1}{2}$$

$$P \Theta = 0$$

RE