$\eta_{s,r}(\tau-h)$

$\eta_{s,r}(\tau-2)$

$\eta_{s,r}(\tau-1)$

$\tau-h$

$\tau-2$

$\tau-1$

s

s

s

History of Entity s

History of Entity o

$\tau-h$

$\tau-2$

$\tau-1$

o

o

o

$\eta_{o,r}(\tau-1)$

$\eta_{o,r}(\tau-2)$

$\eta_{o,r}(\tau-h)$

s

$r?$

o

τ

$u_e^{\tau-1}$

Periodic Patterns

Non-periodic Trends

Static Attributes

u_e^{τ}

Local Structure Prediction

Global Structure Prediction

$$\mathcal{L} = \mathcal{L}_{local} + \epsilon\, \mathcal{L}_{global}$$

$\tau-2$

$\tau-1$

s

τ

o

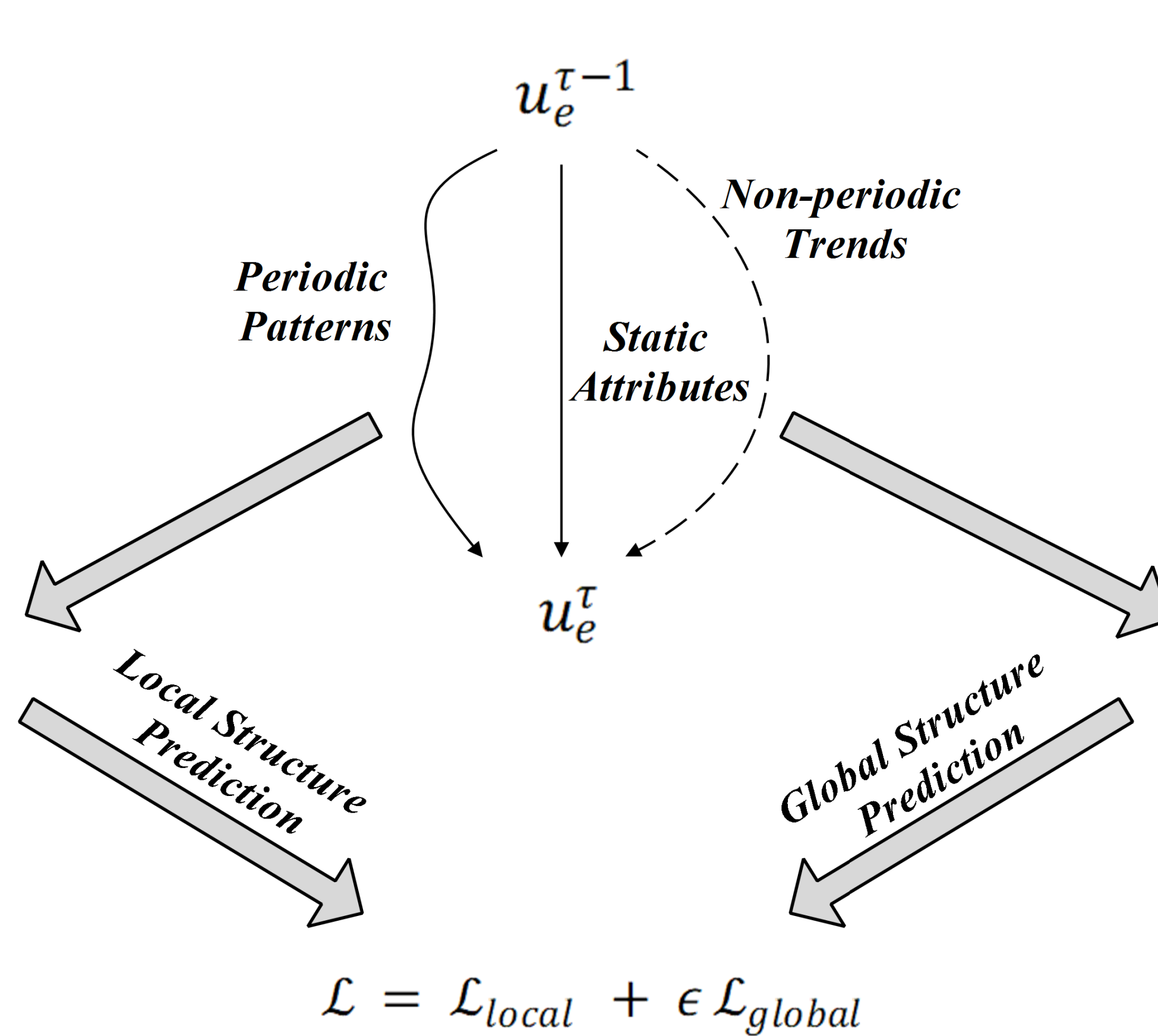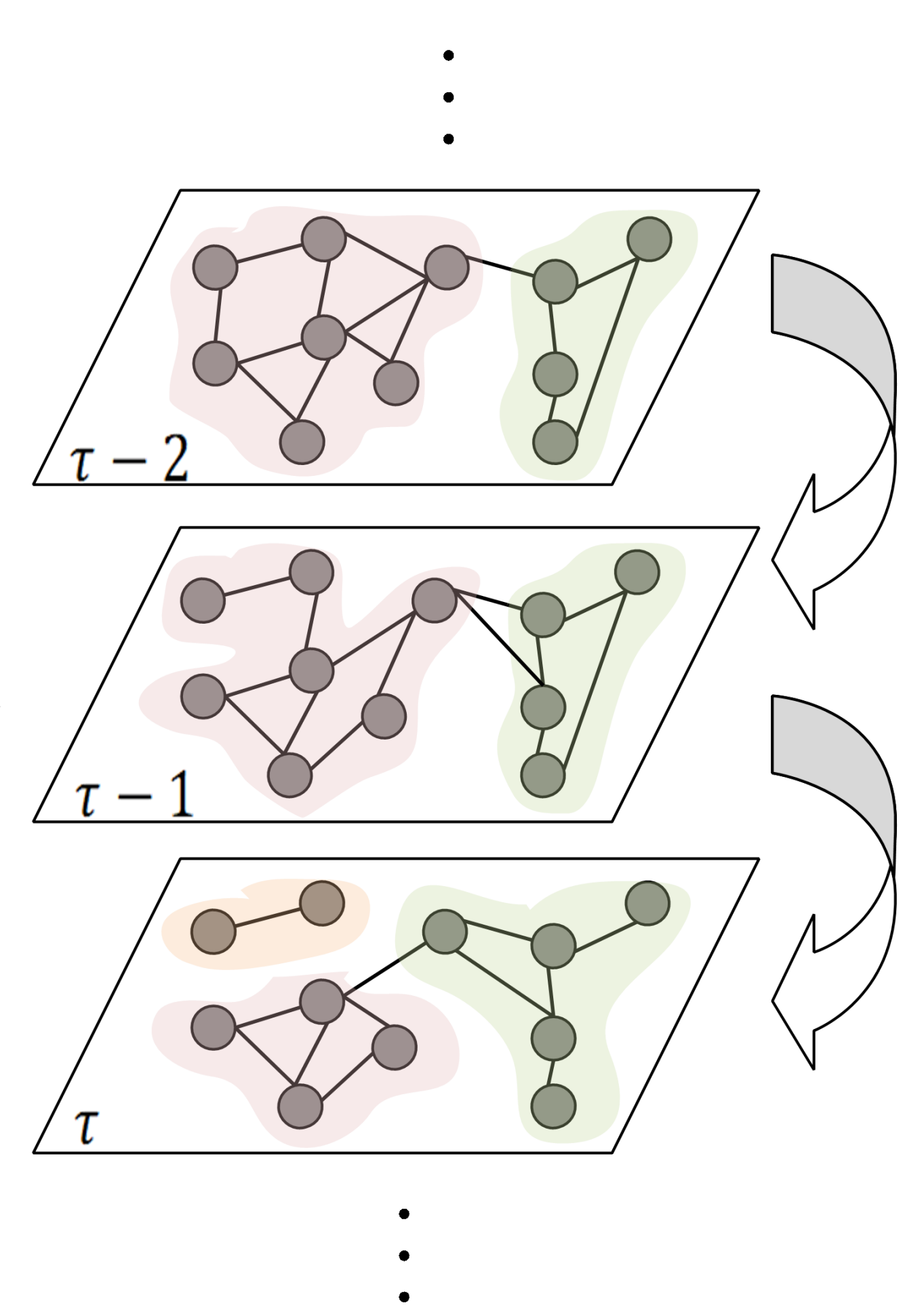**(a) Local structure evolution modeling**   **(c) Joint optimization**   **(b) Global structure evolution modeling**