**input** : $n_{t-1|t-1}$, $(r^i_{t-1|t-1}, \bar{x}^i_{t-1|t-1}, \mathbf{P}^i_{t-1|t-1}) \; \forall \; i \in \{1, \ldots, n_{t-1|t-1}\}$; $n^u_{t-1|t-1}$, $(\lambda^{u,k}_{t-1|t-1}, \bar{x}^{u,k}_{t-1|t-1}, \mathbf{P}^{u,k}_{t-1|t-1}) \; \forall \; k \in \{1, \ldots, n^u_{t-1|t-1}\}$

**output**: $n_{t|t-1}$, $(r^i_{t|t-1}, \bar{x}^i_{t|t-1}, \mathbf{P}^i_{t|t-1}) \; \forall \; i \in \{1, \ldots, n_{t|t-1}\}$; $n^u_{t|t-1}$, $(\lambda^{u,k}_{t|t-1}, \bar{x}^{u,k}_{t|t-1}, \mathbf{P}^{u,k}_{t|t-1}) \; \forall \; k \in \{1, \ldots, n^u_{t|t-1}\}$

*Predict existing tracks*

$n_{t|t-1} := n_{t-1|t-1}$

**for** $i \in \{1, \ldots, n_{t|t-1}\}$ **do**

  $r^i_{t|t-1} := P^{\mathrm{s}} r^i_{t-1|t-1}$

  $\bar{x}^i_{t|t-1} := \mathbf{F} \bar{x}^i_{t-1|t-1}$

  $\mathbf{P}^i_{t|t-1} := \mathbf{F} \mathbf{P}^i_{t-1|t-1} \mathbf{F}^T + \mathbf{Q}$

**end**

*Predict existing PPP intensity*

$n^u_{t|t-1} := n^u_{t-1|t-1} + n^b$

**for** $k \in \{1, \ldots, n^u_{t-1|t-1}\}$ **do**

  $\lambda^{u,k}_{t|t-1} := P^{\mathrm{s}} \lambda^{u,k}_{t-1|t-1}$

  $\bar{x}^{u,k}_{t|t-1} := \mathbf{F} \bar{x}^{u,k}_{t-1|t-1}$

  $\mathbf{P}^{u,k}_{t|t-1} := \mathbf{F} \mathbf{P}^{u,k}_{t-1|t-1} \mathbf{F}^T + \mathbf{Q}$

**end**

*Incorporate birth intensity into PPP*

**for** $k \in \{1, \ldots, n^b\}$ **do**

  $\lambda^{u,k+n^u_{t-1|t-1}}_{t|t-1} := \lambda^{b,k}$

  $\bar{x}^{u,k+n^u_{t-1|t-1}}_{t|t-1} := \bar{x}^{b,k}$

  $\mathbf{P}^{u,k+n^u_{t-1|t-1}}_{t|t-1} := \mathbf{P}^{b,k}$

**end**