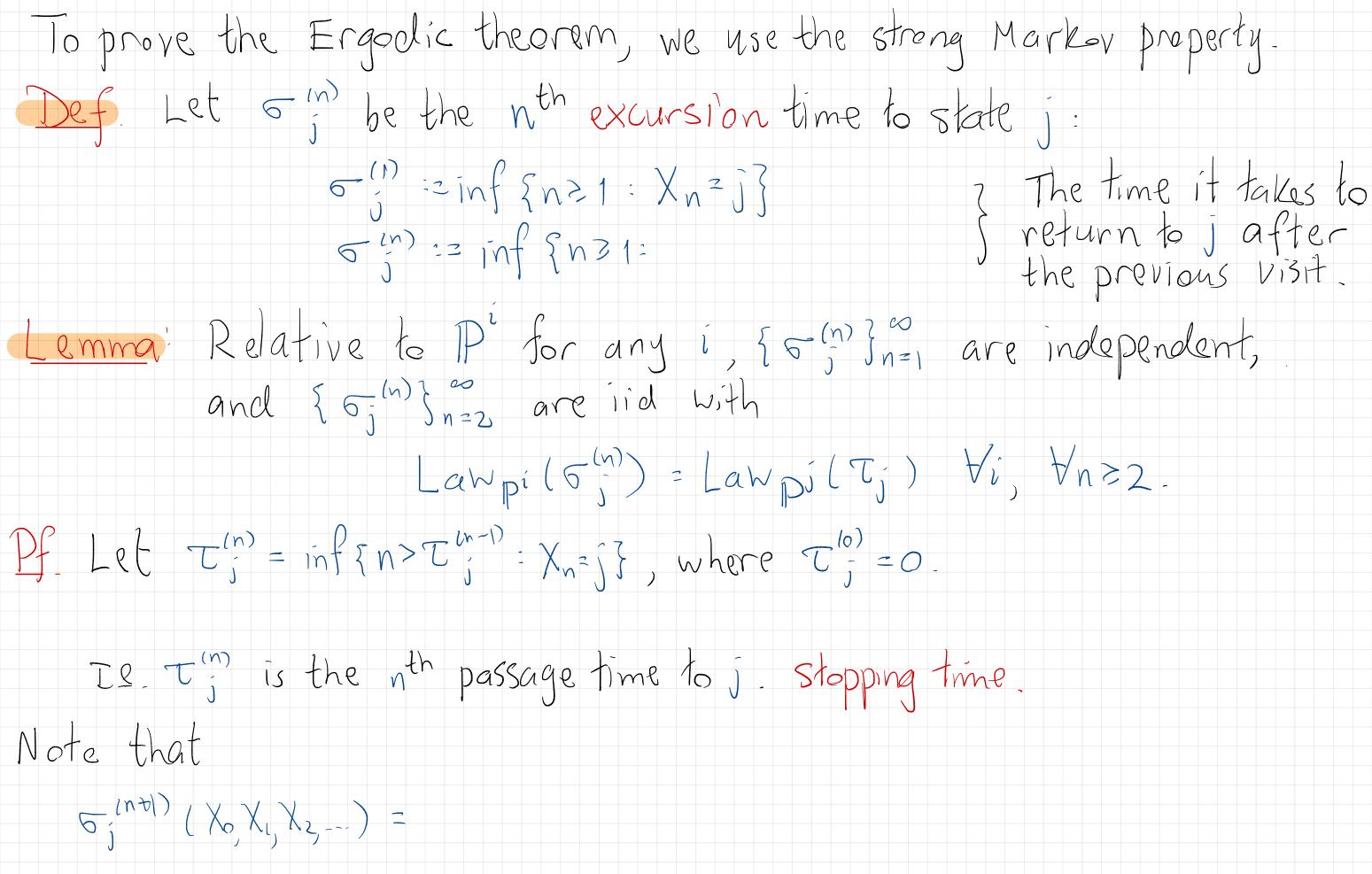


It's not hard to see that if $q^n(i,j) \xrightarrow{\rightarrow} v_j$. $\forall i$, then v is invariant. The Ergodic theorem is a kind of converse; but it does not imply Indeed, that kind of pointwise convergence is just not true in general.

 $Eg. q = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$ Unique invariant distribution N=

and the chain is positive recurrent with

 $\mathbb{E}^{\nu}[\mathbb{T}_{i}] =$ But, for all i, (gri,j))n=0 alternates between 0,1. The chain is periodic.



 $5_{j}^{(n+b)}(X_{0}, X_{1}, X_{2}, ...) = 5_{j}^{(1)}(X_{T_{j}}^{m}, X_{T_{j}}^{m}+1, X_{T_{j}}^{m}+2, ...)$ Since X-T'' = j, and since T'' is a stepping time, by the Strong Markov property: • 5 (n+1) is independent from (Xo, X1, ..., X-1) L But 5(1), ..., 5(n) are functions of

