

DCF and Markov chain

Problem statement

STA notation, AP as a particular case of STA, BSS.

UL/DL.

TCP/UDP traffic.

Spectrum, its division into 20M RUs (802.11g).

Space division SISO/MISO/MIMO/MU-MIMO. Channel as complex matrix.

Protocols in time domain: g/n/ac/ax/be.

Collision.

DCF (Distributed Coordination function)

Calculate CW after transmission: depending on collision existence set as CWmin or $\times 2$, then backoff counter from $(0, CW]$.

STA always listens the channel, if it does not transmit. CCA ED/SD.

Channel is free: DIFS (distributed (coordination function) interframe space), then decrease backoff counter with granule AIFSN (depends on AC).

If backoff counter has zero value, then transmission is started (move to TXOP state).

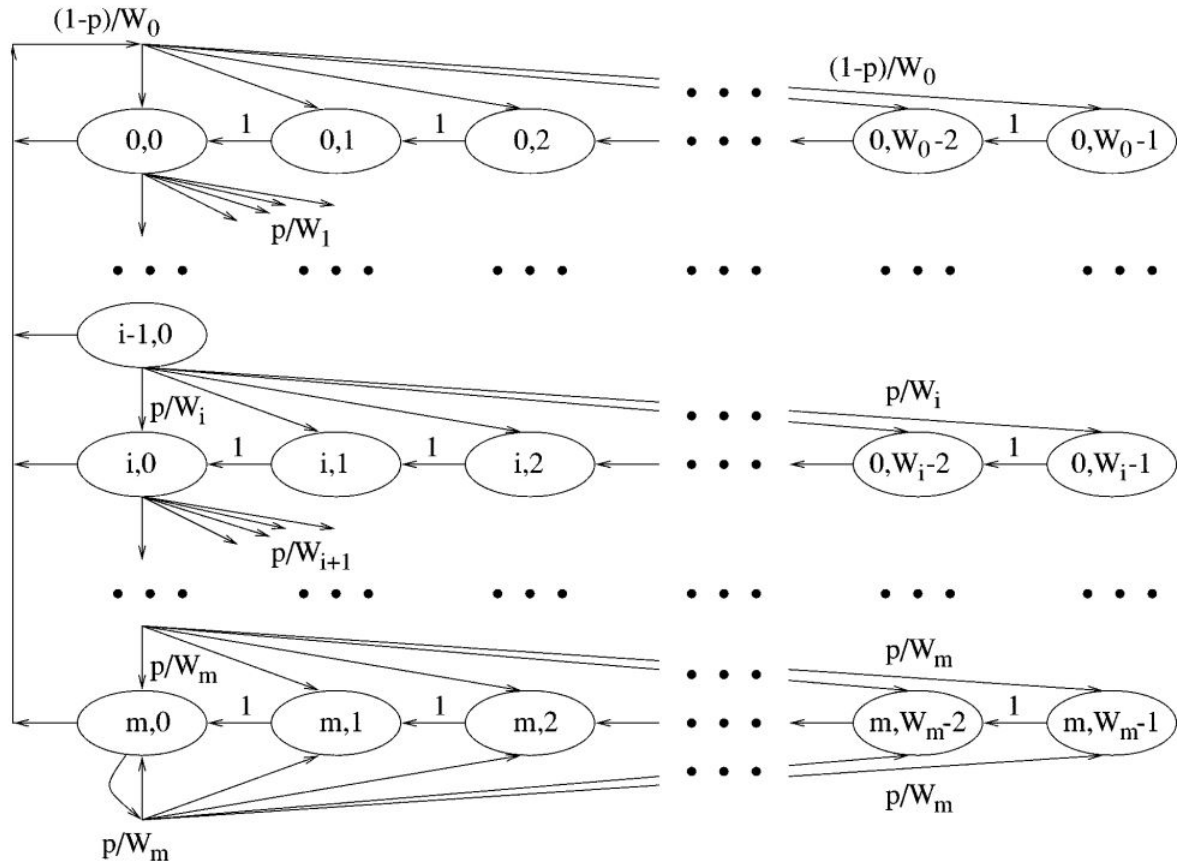
RTS/CTS.

Bianchi model

Markov chain.

Its vertices: $\{s(t), b(t)\}$: $s(t)$ – backoff stage; $b(t)$ – backoff counter.

Denote by p collision probability; by τ probability of transmission by STA; by W_i expression $2^i W_0$.



One can express p, τ in terms $\tau(p), p(\tau)$.