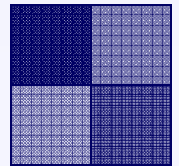


Attractive Binary Models

$$p(x) = \frac{1}{Z} \prod_{s \in V} \psi_s(x_s) \prod_{(s,t) \in E} \psi_{st}(x_s, x_t)$$

- A pairwise MRF has *attractive* compatibilities if all edges (s, t) satisfy the following bound:

$$\psi_{st}(0, 0) \psi_{st}(1, 1) \geq \psi_{st}(0, 1) \psi_{st}(1, 0)$$



- Equivalent condition on reparameterized *pseudo-marginals*:

$$\text{Cov}_{q_{st}}(X_s, X_t) = \tau_{st} - \tau_s \tau_t \geq 0$$

- In statistical physics, such models are *ferromagnetic*
- Extensive literature on *correlation inequalities* bounding moments of attractive fields: *GHS, FKG, GKS, ...*