Noise Margin

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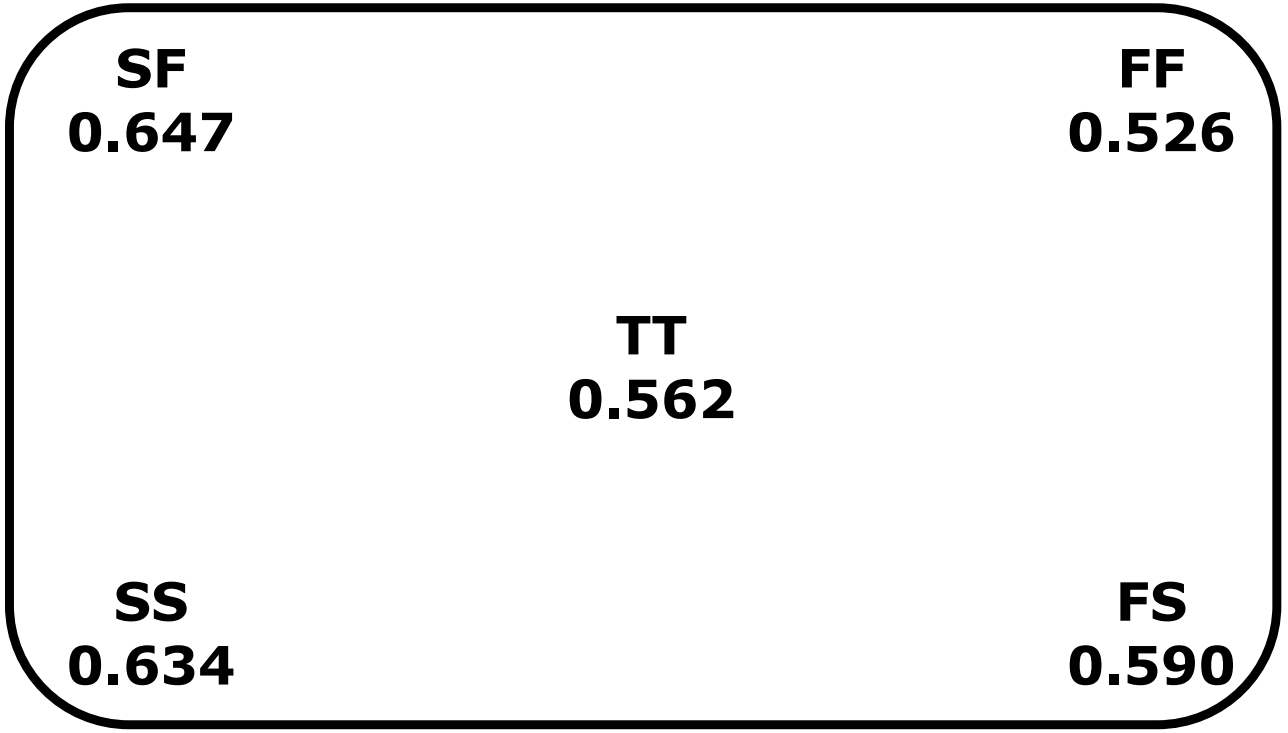
Procedure

- Hspice simulation
- Download data
- Post-processing done by python
  - Rotate the curves ccw by 45 degree
  - Subtract two curves
  - Find min(local maximum, -local minimum) for SNM, RNM
  - Find local maximum (or global maximum) for WNM

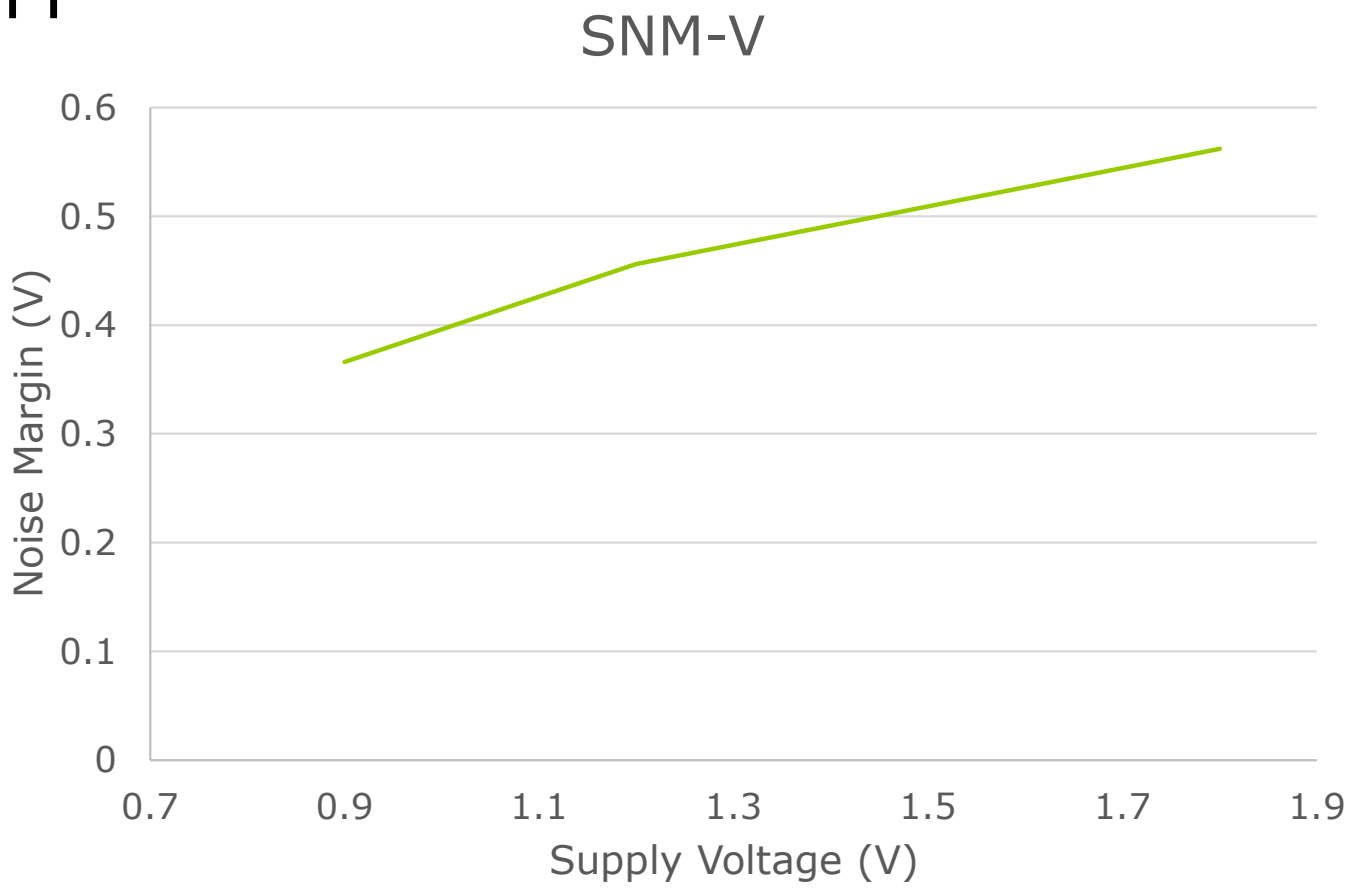
SNM (corners)

- Best at SF, worst at FF



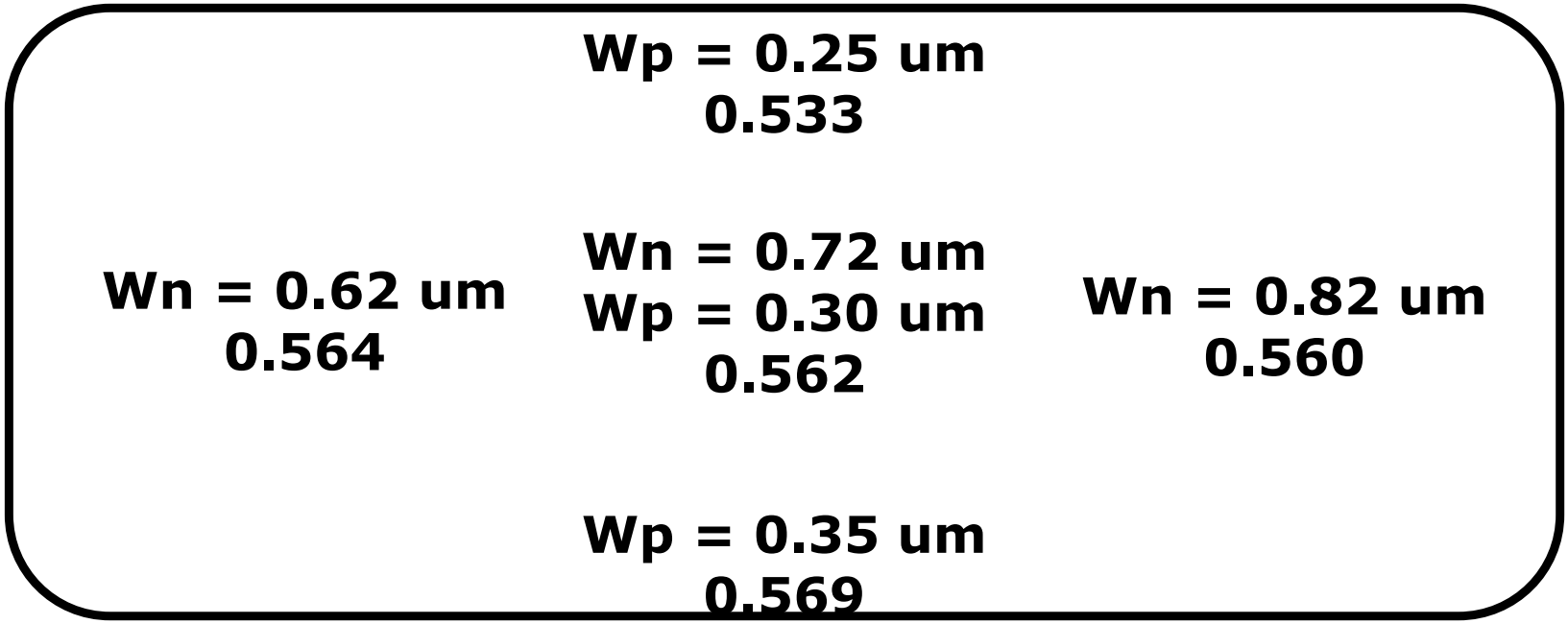
SNM (supply voltage)

- Roughly linear to VDD
  - At TT



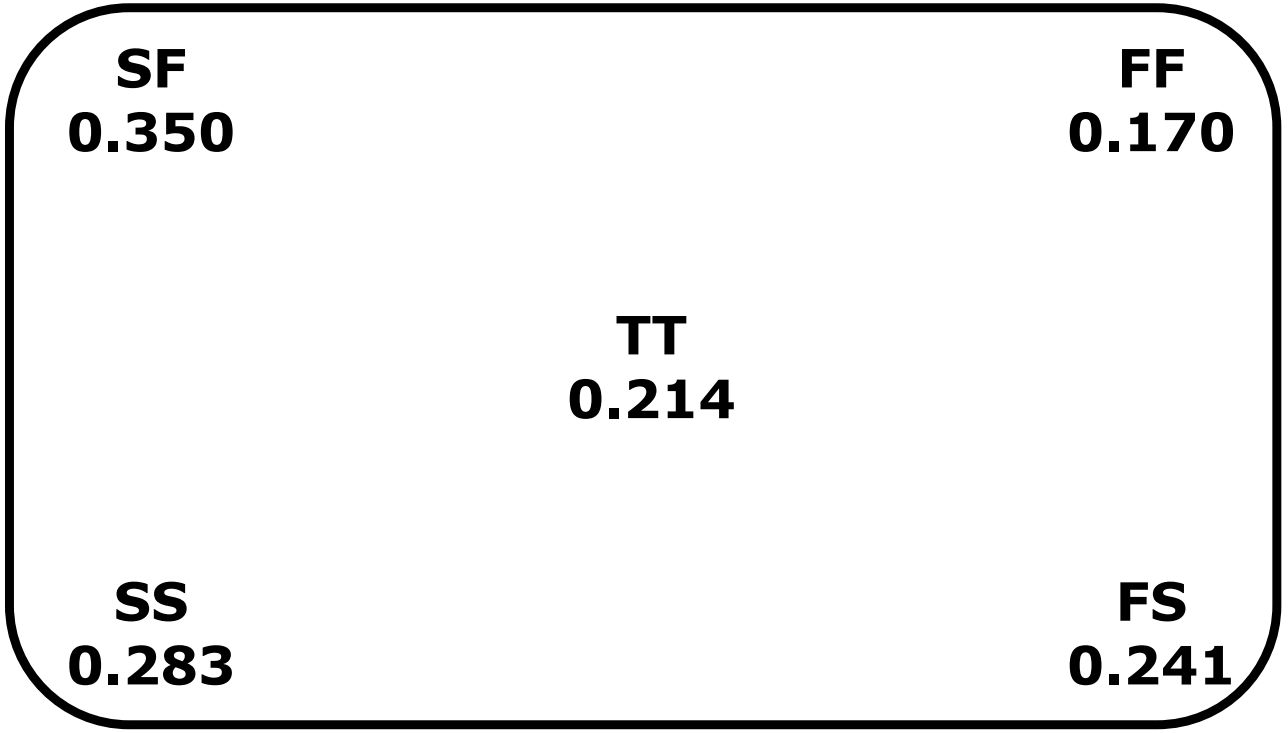
SNM (width)

- Noise margin ↑ with Wn ↓ or Wp ↑
  - VDD = 1.8 V



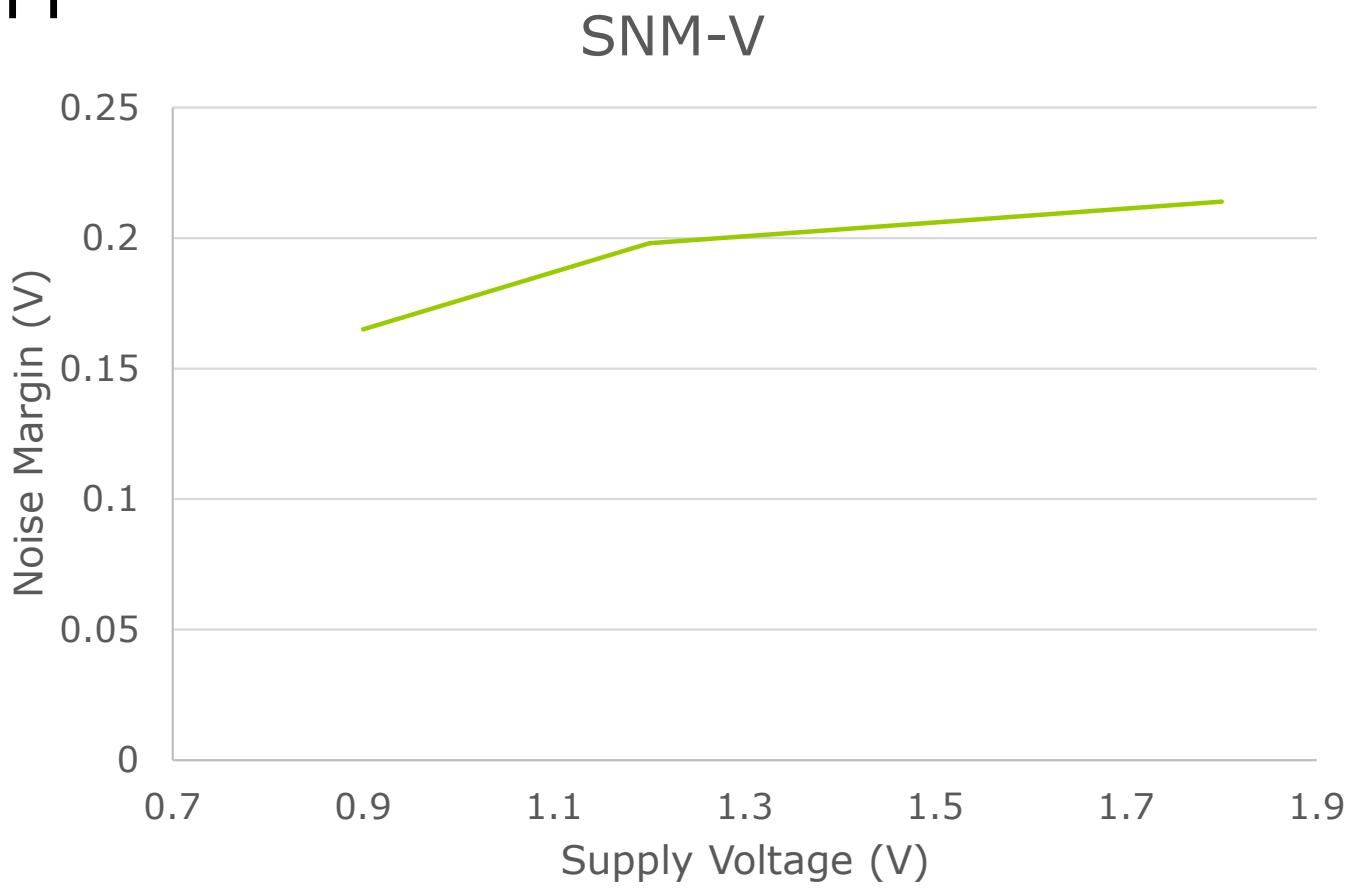
RNM (corners)

- Best at SF, worst at FF



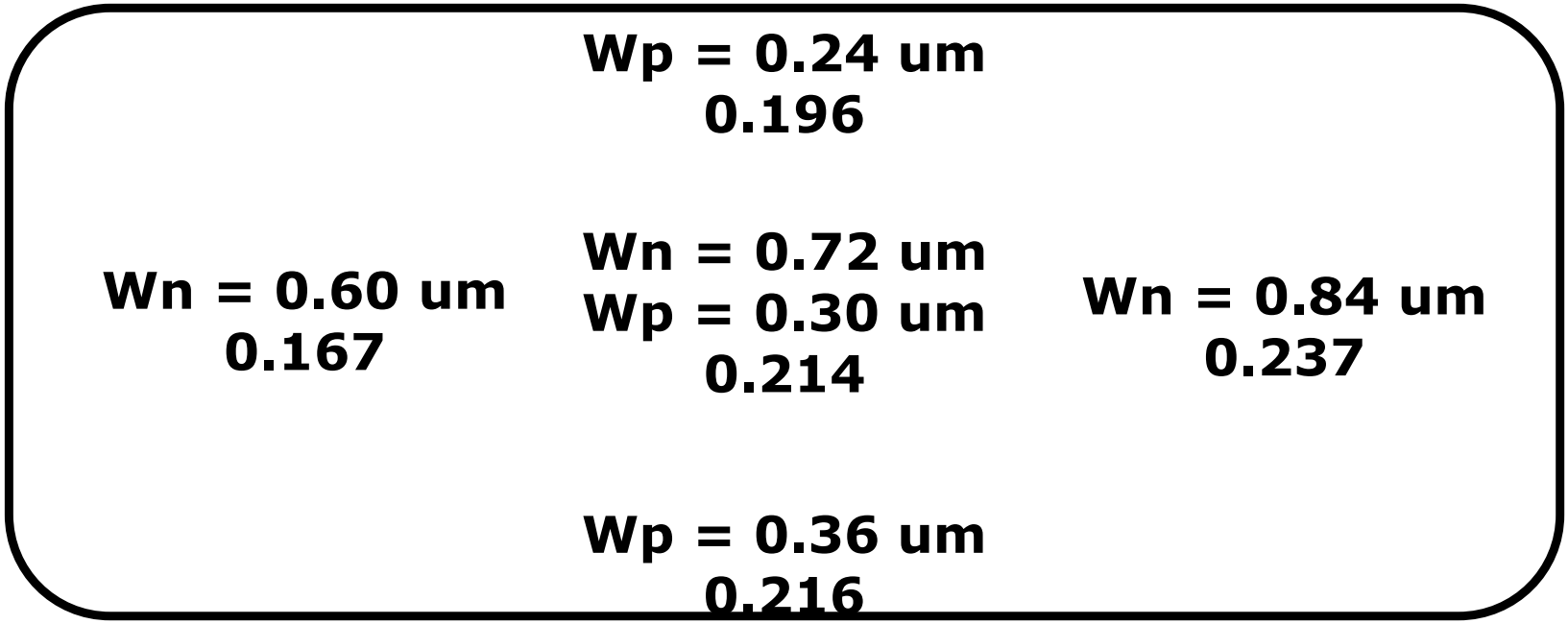
RNM (supply voltage)

- NM ↓ with VDD ↓
  - At TT



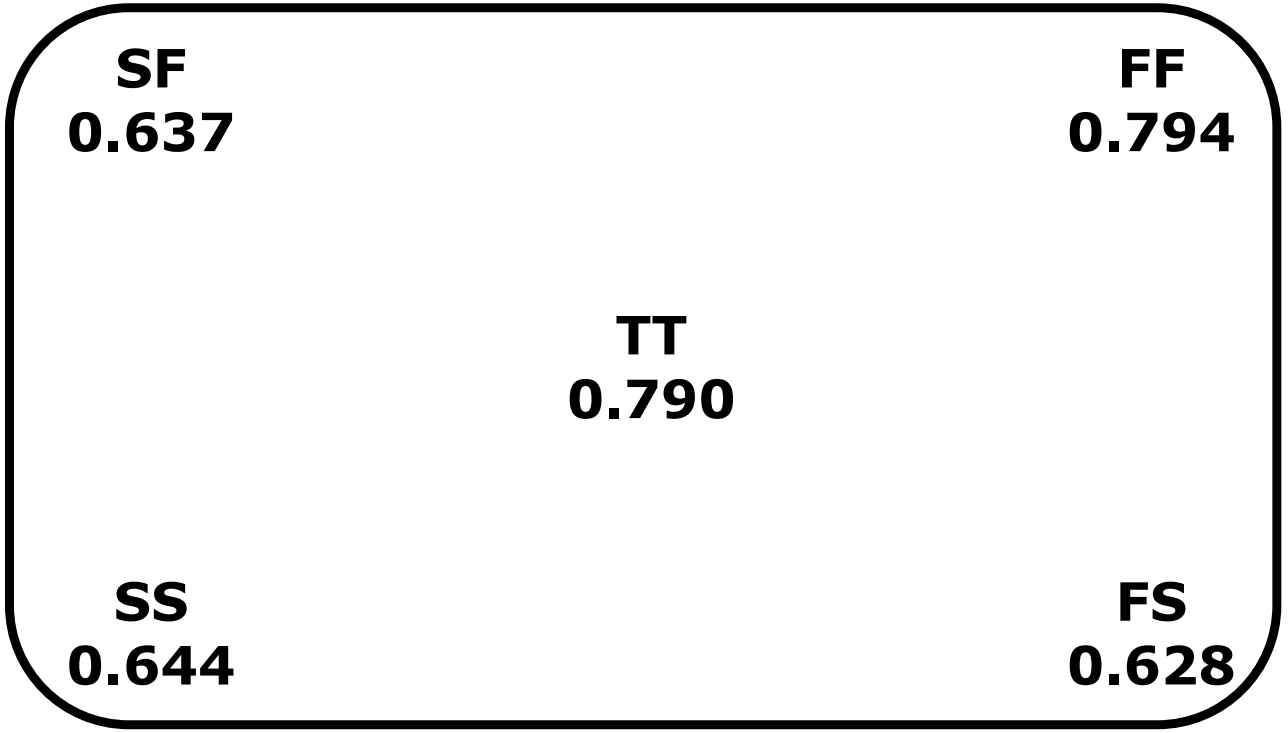
RNM (width)

- Noise margin ↑ with Wn ↓ or Wp ↑
  - VDD = 1.8 V



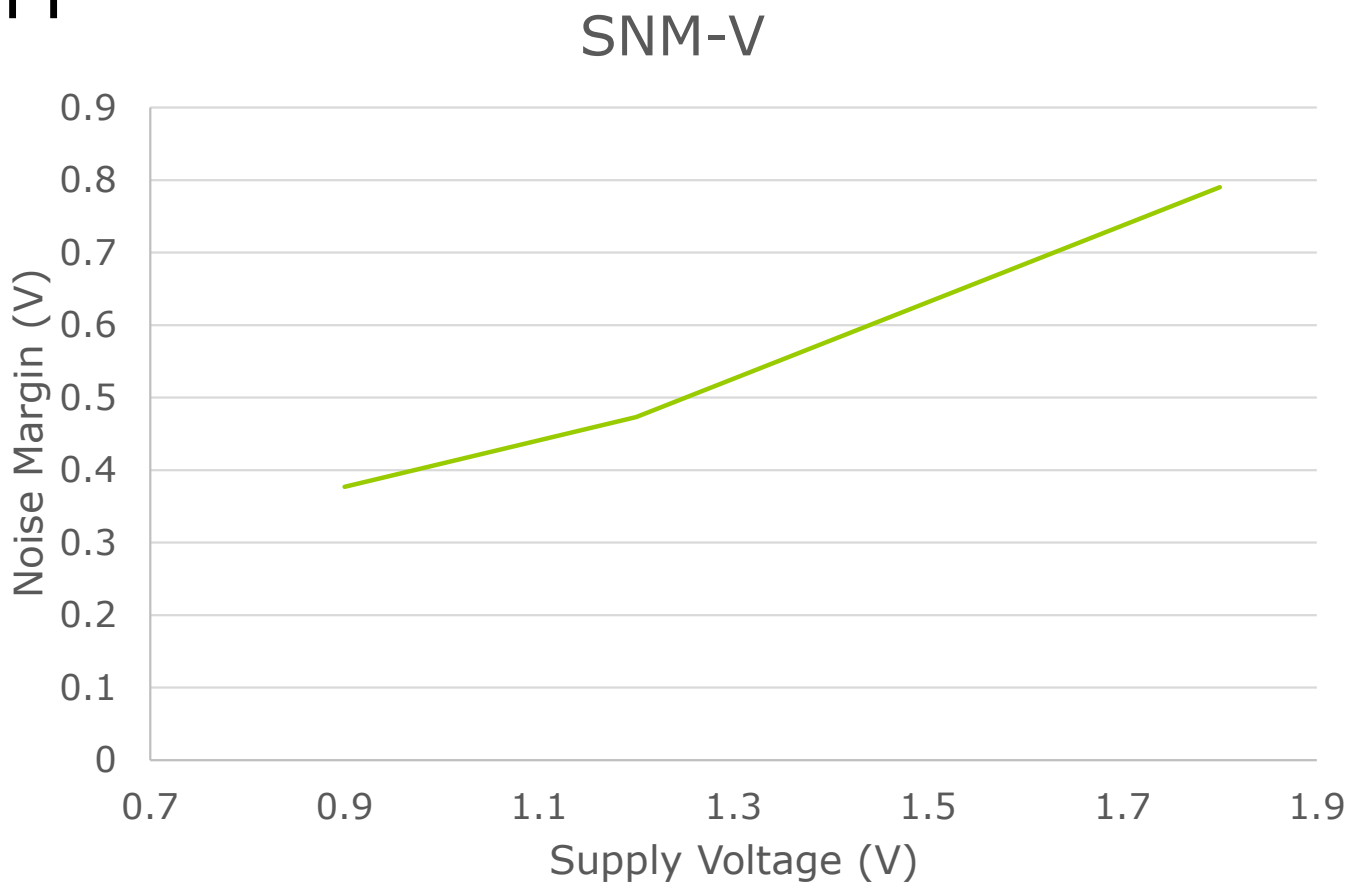
WNM (corners)

- Best at FF, worst at FS



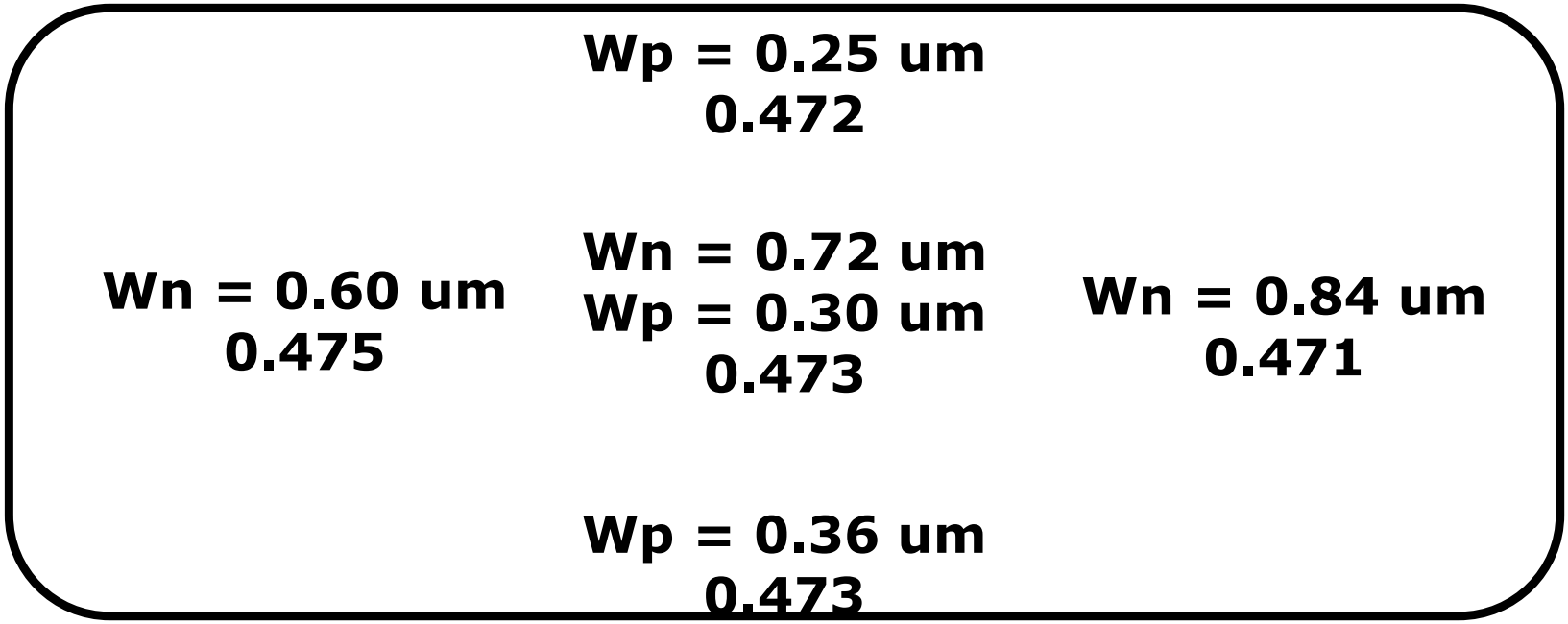
WNM (supply voltage)

- Roughly linear to VDD
  - At TT



WNM (width)

- Noise margin ↑ with Wn ↓ or Wp ↑
  - VDD = 1.2 V



WNM

- Some special cases

monotonic