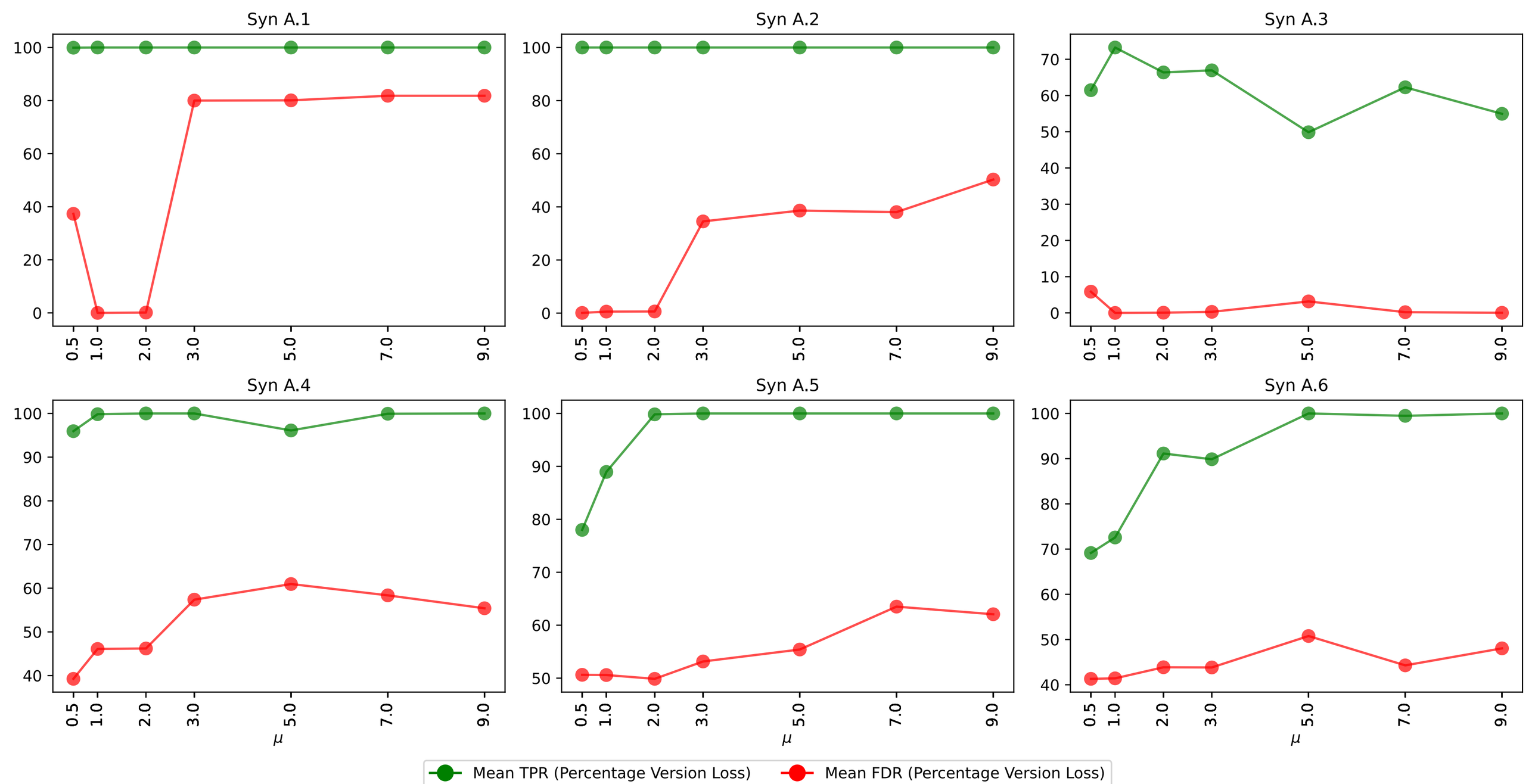
# Exploration of Potential Improvements to INVASE

# Application of Percentage Version Loss




Individual Settings: **Activation**: ReLU; **Policy**: Post-Training Selection Policy ($I = 10k$, $m = 100$, $r = 500$, $k = 7$)

✦ Sensitivity is significantly reduced

- Effective tuning range for the hyperparameter is significantly expanded
  - INVASE: around 1
  - Percentage version: around 10

✦ Obviously not good at FDR

- Syn A.4 - A.6: FDR is around 40-60%

➡ Not Good

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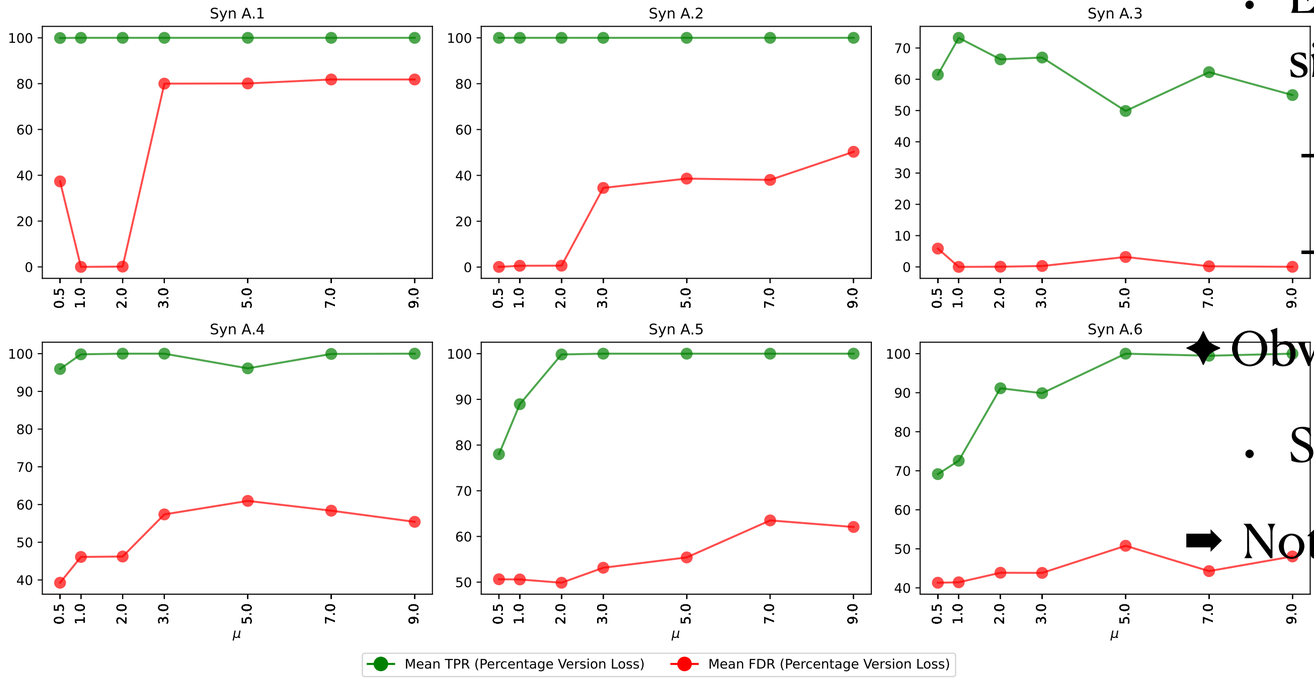


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## Detailed Comparison of TPR and FDR

Table 5.1: Comparison between the revised loss functions and *INVASE*

| Methods | (Mean, Std) | Synethetic Datasets | | | | | |
|---|---|---|---|---|---|---|---|
| | | A.1 | A.2 | A.3 | A.4 | A.5 | A.6 |
| *INVASE* | TPR | **(100, 0)** | **(100,0)** | **(100, 0)** | (100, 0) | (73, 28) | **(72, 28)** |
| | FDR | **(0, 0)** | **(0, 0)** | **(0, 0)** | (39, 18) | (23, 16) | **(5, 13)** |
| Direct Replacement Version Loss | TPR | **(100, 0)** | **(100, 0)** | (91, 12) | **(97, 13)** | **(83, 20)** | **(73, 25)** |
| | FDR | **(0, 0)** | **(0, 0)** | (0, 0.7) | **(13, 24)** | **(19, 18)** | **(7, 15)** |
| Percentage Version Loss | TPR | **(100, 0)** | **(100, 0)** | (71, 17) | (100, 0) | (71, 25) | (90, 10) |
| | FDR | **(0, 0)** | **(0, 0)** | (0, 0) | (41, 16) | (23, 16) | (44, 7) |

Attempts: **Activation**: ReLU or Selu; **Policy**: Post-Training Selection Policy ($I = 10k$, $m = 100$, $r = 500$, $k = 7$) or Early Stop Policy ($\delta = 3e-3, T = 5$); **Maximum Iterations**: 10k

Hyperparameters: ***INVASE***: $\lambda = 0$ to 1, step 0.1; **Direct Replacement Version Loss**: $\lambda^* = 0$ to 1, step 0.1; **Percentage Version Loss**: $\mu = 0.5, 1, 2, 3, 5, 7, 9$.