**a) Method Characteristics** | **b) Evaluation Summary**

The application scenarios | Scores of overall performace and four criteria

| Class 1 Method | Platform | Prior Information | Groups | DEGs | Batches | Trajectory | Overall | Accuracy | Functionality | Scalability | Usability |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SPARSim | R | group labels (optional)<br>ERCC spike-in (optional) | ✓ | ✓ | ✓ | | | | | | |
| Splat | R | | ✓ | ✓ | ✓ | | | | | | |
| powsimR | R | ERCC spike-in (optional) | ✓ | ✓ | ✓ | | | | | | |
| SplatPop | R | | ✓ | ✓ | ✓ | | | | | | |
| SPsimSeq | R | group labels (optional)<br>batch labels (optional) | ✓ | ✓ | ✓ | | | | | | |
| **Class 2 Method** | | | | | | | | | | | |
| Lun | R | | ✓ | ✓ | | | | | | | |
| scDesign | R | | ✓ | ✓ | | | | | | | |
| muscat | R | group labels (optional) | ✓ | ✓ | | | | | | | |
| Lun2 | R | group labels | ✓ | ✓ | | | | | | | |
| ESCO | R | group labels (optional) | ✓ | ✓ | | | | | | | |
| **Class 3 Method** | | | | | | | | | | | |
| scDesign2 | R | group labels (optional) | ✓ | | | | | | | | |
| POWSC | R | | ✓ | | | | | | | | |
| hierarchicell | R | | ✓ | | | | | | | | |
| SparseDC | R | group labels | ✓ | | | | | | | | |
| **Class 6 Method** | | | | | | | | | | | |
| ESCO-tree | R | group labels (optional) | ✓ | ✓ | | ✓ | | | | | |
| ESCO-traj | R | group labels (optional) | ✓ | ✓ | | ✓ | | | | | |
| TedSim | R | group labels (optional) | ✓ | | | ✓ | | | | | |
| SymSim | R | group labels (optional) | ✓ | | | ✓ | | | | | |
| VeloSim | R | group labels (optional) | ✓ | | | ✓ | | | | | |