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| Method | CDDR Diagnostic Colors | Description | CDDR Diagnostic Plot and Interpretation:  Schematic examples of the diagnostic, with the x-axis representing subsample sizes less than or equal to , and the y-axis representing casual outcome rates. Interpretation assumes a consistent direction, acyclicity, i.i.d data, and no unobserved confounding. | |
| LiNGAM with HSIC | orange (CDDR) | Proportion of subsamples determining , indicating . | A graph with a curved line  Description automatically generated | * As subsample size increases, CDDR quickly approaches 1 (orange line), while the rate of detecting the other direction quickly approaches 0 (blue line). Provides strong evidence in favor of non-Gaussianity holding. |
| blue | Proportion of subsamples determining , indicating . | A graph with a line  Description automatically generated | * Rates for determining both directions are around 0.5 across subsample sizes (orange and blue lines). Provides strong evidence for non-Gaussianity assumption violations. |
|  | * Cannot say much about linearity assumption violations. |
| Test-based Approach | orange (CDDR) | Proportion of subsamples rejecting only , indicating . | A graph with colored lines  Description automatically generated | * As subsample size increases, CDDR quickly approaches 1 (orange line), while the other outcome rates quickly approach 0 (blue, purple, and green lines). Provides strong evidence that both non-Gaussianity and linearity hold, and that the directionality is . |
| blue | Proportion of subsamples rejecting only , indicating . | A graph with colored lines  Description automatically generated | * As subsample size increases, the rate of rejecting both directions quickly approaches 1 (purple line), while the other outcome rates quickly approach 0 (orange, blue, and green lines). Provides strong evidence for linearity assumption violations. Cannot conclude directionality. |
| purple | Proportion of subsamples rejecting in both directions, indicating linearity assumption violation. | A graph with colored lines  Description automatically generated | * Across subsample sizes, the rate of failing to reject both directions is around 1 (green line), while the other outcome rates is around 0 (orange, blue, and purple lines). Provides strong evidence for non-Gaussianity assumption violations. Cannot conclude directionality. |
| green | Proportion of subsamples failing to reject in both directions, indicating small sample size or non-Gaussianity assumption violation. | a)  A graph of colored lines  Description automatically generated  b)  A graph with colored lines  Description automatically generated | * Other patterns may indicate evidence of moderate assumption violations, but further information is needed to draw conclusions about the directionality. Factors to consider include the magnitude and duration of the CDDR, as well as the sample sizes for which the direction is favored. * For example, for both a) and b), we have some evidence of linearity assumption violations but for a) we cannot say much about the casual direction, whereas b) provides a stronger case for the direction |