Measure	Formula	Description	Reference	DOI
Envelope Correlation	$\mathrm{AEC}_{x,y} = \frac{\sum_{t=1}^{T}(A_x(t)-\bar{A}_x)(A_y(t)-\bar{A}_y)}{\sqrt{\sum_{t=1}^{T}(A_x(t)-\bar{A}_x)^2}\cdot\sqrt{\sum_{t=1}^{T}(A_y(t)-\bar{A}_y)^2}}$	Measures how closely the fluctuations in the strength (amplitude) of oscillations in one brain area match the fluctuations in another, without focusing on the precise timing (phase) of the oscillations. Values range from –1 (perfect anti-correlation) to +1 (perfect correlation), with 0 indicating no relationship.	Bruns et al., 2000	PMID: 10841367
Coherence	$\mathrm{Coh}_{xy}(f) = \frac{S_{xy}(f)}{\sqrt{S_{xx}(f)\cdot S_{yy}(f)}}$	Quantifies the consistency of the linear interactions between two signals at a specific frequency by calculating the squared magnitude of their cross-spectrum normalized by their individual power spectra. It reflects how similarly two signals oscillate within a frequency band, with values ranging from 0 (no consistent linear interaction at frequency f) and 1 (maximal linear interaction at frequency f).	Pereda et al., 2005	https://doi.org/10.1016/j.pneurobio.2005.10.003
Magnitude Squared Coherence	$\mathrm{MSC}_{xy}(f) = \frac{\lvert S_{xy}(f)\rvert^2}{S_{xx}(f)\cdot S_{yy}(f)}$	Quantifies the linear correlation between two signals as a function of their frequency. Values range between 0 (no linear relationship at frequency f) and 1 (perfect linear coupling at frequency f).	Miskovic and Keil, 2014	https://doi.org/10.1111/psyp.12287
Imaginary Coherence	$\mathrm{iCoh}_{xy}(f) = \left\lvert \mathrm{Im}\left(\frac{S_{xy}(f)}{\sqrt{S_{xx}(f)\cdot S_{yy}(f)}}\right)\right\rvert$	Quantifies the consistency of non-zero phase-lagged interactions between two signals by focusing on the imaginary component complex coherence. This reduces the influence of volume conduction and zero-lag correlations, helping to isolate frequency-specific dependencies that are less likely to arise from signal spread. Values range between 0 (no consistent lagged interaction at frequency f) and 1 (maximal lagged interaction at frequency f).	Nolte et al., 2004	https://doi.org/10.1016/j.clinph.2004.04.029
Lagged Linear Coherence	$\mathrm{LLC}_{xy}(f) = \sqrt{\frac{\left[\mathrm{Im}(S_{xy}(f))\right]^2}{S_{xx}(f)\cdot S_{yy}(f)-\left[\mathrm{Re}(S_{xy}(f))\right]^2}}$	Quantifies the linear relationship between complex-valued variables, with the exclusion of zero-lag contributions. Values range between 0 (no lagged linear connectivity at frequency f) and 1 (perfect lagged linear coupling at frequency f).	Pascual-Marqui et al., 2011	https://doi.org/10.1098/rsta.2011.0081
Directed Coherence	$\mathrm{DC}_{ij}(f) = \frac{\lvert A_{ij}(f)\rvert}{\sqrt{\sum_{m=1}^{N}\lvert A_{im}(f)\rvert^2}}$	Analyzes the linear dependence between two signals, considering the direction of the interaction. Values range between 0 (no directed influence from i to j at frequency f) and 1 (perfect directed influence from i to j at frequency f).	Wang and Takigawa, 1992	https://doi.org/10.1016/0167-8760(92)90051-c
Partial Directed Coherence	$\mathrm{PDC}_{ij}(f) = \frac{A_{ij}(f)}{\sqrt{\mathbf{a}_j^H(f)\mathbf{a}_j(f)}}$	Analyzes the linear dependence between two signals, considering the direction of the interaction as well as the influence of other variables on the two signals. Values range between 0 (no directed influence from i to j at frequency f) and 1 (perfect directed influence from i to j at frequency f).	Baccalà and Sameshima, 2001	https://doi.org/10.1007/pl00007990
Generalized Partial Directed Coherence	$\mathrm{gPDC}_{ij}(f) = \frac{A_{ij}(f)/\sigma_{jj}^{1/2}}{\sqrt{\sum_{k=1}^{N}\frac{\lvert A_{kj}(f)\rvert^2}{\sigma_{jj}}}}$	Quantifies the linear dependence between two time series while accounting for the influence of other simultaneously observed time series, providing a normalized measure of directionality from one signal to another. Values range between 0 (no direct interaction from i to j at frequency f) and 1 (maximum directional interaction from i to j at frequency f).	Baccalà et al., 2007	https://doi.org/10.1109/ICDSP.2007.4288544
Phase Synchronization Index	$\mathrm{PSI}_{xy} = \left\lvert \frac{1}{N}\sum_{t=1}^{N} e^{i(\phi_x(t)-\phi_y(t))}\right\rvert$	Estimates phase synchrony between EEG signals by computing the temporal consistency of phase differences between the signals in a given time window. Values range between 0 (phase differences are uniformly distributed, meaning no synchronization) and 1 (constant phase difference across time, meaning perfect phase synchronization).	Kawano et al., 2017	https://doi.org/10.1177/1545968317697031
Phase Lag Index	$\mathrm{PLI}_{xy} = \left\lvert \frac{1}{N}\sum_{t=1}^{N} \mathrm{sign}(\phi_x(t)-\phi_y(t))\right\rvert$	Estimates phase synchrony between EEG signals by computing the asymmetry of phase differences between the signals in a given time window. Values range between 0 (random or 0-lag phase difference) and 1 (maximum phase asymmetry).	Kawano et al., 2017	https://doi.org/10.1177/1545968317697031
Weighted Phase Lag Index	$\mathrm{wPLI}_{xy} = \frac{\left\lvert\sum_{t=1}^{N}\Im(C_{xy}(t))\cdot\mathrm{sign}(\Im(C_{xy}(t)))\right\rvert}{\sum_{t=1}^{N}\lvert\Im(C_{xy}(t))\rvert}$	Weighted Phase Lag Index (wPLI) quantifies the consistency of non-zero phase lag between two EEG signals, giving more weight to phase differences with a larger imaginary component. It is designed to reduce sensitivity to noise and minimize the influence of volume conduction or common sources. Values range between 0 (no consistent phase lag) and 1 (perfectly consistent non-zero phase lag).	Vinck et al., 2011	https://doi.org/10.1016/j.neuroimage.2011.01.055
Debiased Weighted Phase Lag Index	$\mathrm{dwPLI} = \frac{\sum_{t=1}^{N}(\Im(C_{xy}(t)))^2-\sum_{t=1}^{N}\mathrm{Var}(\Im(C_{xy}(t)))}{\sum_{t=1}^{N}\lvert\Im(C_{xy}(t))\rvert^2}$	Reduces the bias introduced by a limited number of trials or samples when estimating phase synchronization, by down-weighting contributions near zero phase lag. It focuses on consistent non-zero phase lag interactions, minimizing the effects of volume conduction. dwPLI is mathematically equivalent to the corrected imaginary Phase Locking Value (ciPLV). Values range from 0 (no consistent phase lag) to 1 (perfectly consistent non-zero phase lag)	Vinck et al., 2011	https://doi.org/10.1016/j.neuroimage.2011.01.055
Conditional Granger Causality	$\mathrm{cGC}_{x\to y\mid z}(f) = \ln\left(\frac{S_{yy\mid z}(f)}{S_{yy\mid xz}(f)}\right)$	Extends pairwise Granger Causality by assessing whether one time series helps predict another, while controlling for the influence of one or more additional time series. This allows the identification of direct directional interactions that are not mediated by other observed signals. Higher cGC values indicate stronger frequency-specific directed interactions from x to y that is not explained by z.	Geweke, 1982	https://doi.org/10.2307/2287238
O-Information Rate	$\mathrm{OIR}_{X_i;X_j;X_k}(f) = f_{X_i;X_j}(f) + f_{X_i;X_k}(f) - f_{X_i;X_j;X_k}(f)$	Measures the balance between redundant and synergistic information shared among groups of three or more variables. Positive values indicate that redundancy dominates (i.e., variables tend ot share overlapping information), while negative values reflect a predominance of synergy (i.e., joint interactions reveal more than the sum of individual contributions).	Faes et al., 2022	https://doi.org/10.1109/TSP.2022.3221892
Direct Directed Transfer Function	$\mathrm{dDTF}_{ij}(f) = \gamma_{ij}(f)\cdot\chi_{ij}(f)$	A modification of the Directed Transfer Function (DTF) designed to distinguish direct from indirect causal connections. It is calculated as the product of the full-frequency DTF (gamma) and Partial Coherence (chi). This ensures that a directed connection is reported only if there is both directed influence and a direct partial correlation, filtering out cascade effects. Values range between 0 (no direct flow) and 1.	Korzeniewska et al., 2003	https://doi.org/10.1016/S0165-0270(03)00052-9