

---

# Index

- N*-body simulation** 4, 12, 25, 29–41, 44, 45, 74, 95–103, 105, 106, 112, 114, 117, 120, 125, 132, 135, 141, 149, 155, 161, 165, 167, 170, 174, 184, 185
- $\Gamma$ -distribution** 71, 72
- $\Lambda$ CDM** lambda cold dark matter 8, 20, 22, 24, 53, 80, 117, 119, 126, 129, 150, 157
- 21 cm surveys** 106
- 2LPT** second-order Lagrangian perturbation theory 24, 29–32, 34, 35, 37–44, 68, 69, 73–75, 80, 81, 83, 86, 87, 89, 91, 96, 98, 99, 101–105, 109–114, 121, 122, 125, 126, 133, 135, 138, 141, 148, 154, 155, 168, 177, 178, 185
- 2LPTRM** second-order Lagrangian perturbation theory remapped 30–32, 34, 35, 103, 104
- 2LPTic** 29, 177
- 3LPT** third-order Lagrangian perturbation theory 41
- ABC** Approximate Bayesian Computation 56
- acceptance rate** 59, 60, 62, 66, 74, 81, 82, 91
- adhesion approximation** 27, 96
- Alcock-Paczynski effect** 2, 9, 126
- aliasing** 31, 169, 170
- ALPT** Augmented Lagrangian perturbation theory 43, 44
- ARES** Algorithm for REconstruction and Sampling 66, 70, 75, 77
- assignment function** 169–171, 173
- auto-correlation function (Markov chain)** 60
- BAO** baryon acoustic oscillations 2, 3, 67, 74, 96, 97, 157, 178
- Bayes factor** 57
- Bayes’ theorem** 51–54, 57, 71
- Bayesian statistics** 4, 49–53, 56, 62, 71, 111, 118, 129, 138, 149, 155
- BBN** Big Bang nucleosynthesis 2
- Bernstein-von Mises theorem** 53
- bias** 2, 34, 52, 62, 66, 68–70, 74, 75, 77, 79–83, 89, 91, 117–119, 121, 125–129, 134, 135, 137, 148, 155, 157
- bispectrum** 15, 34–37, 95, 105, 106, 156
- Blackwell-Rao estimator** 119, 120, 122, 124–127, 129
- Boltzmann constant** 61
- BORG** Bayesian Origin Reconstruction from Galaxies 4, 49, 56, 60, 63, 66–72, 74–77, 79, 80, 82, 86, 89, 91, 92, 109–114, 117, 119–123, 125–129, 131, 133–136, 138, 143, 148, 149, 151, 154–157, 177, 178
- Box-Müller method** 177
- Burgers’ equation** 26, 27
- burn-in** 58, 60, 73–75, 81–83, 91
- canonical distribution** 61, 62
- cdf** cumulative distribution function 97, 100, 101
- CDM** cold dark matter 2, 8, 15, 18, 20, 22, 95, 165
- characteristic function** 161–163
- Cholesky decomposition** 178
- chrono-cosmography** 79, 80, 89, 92, 131, 133, 143, 148, 155, 158
- CiC** cloud-in-cell 29, 31, 34, 68, 73, 74, 101, 113, 138, 170–175, 178, 184, 185
- classical mechanics** 60, 113
- cluster** 4, 29, 37, 38, 40, 44, 45, 75, 91, 92, 96, 99, 100, 103, 111, 118, 126, 131–137, 140–142, 145, 147–152, 154, 156, 179, 181–185
- CMB** cosmic microwave background 10, 52, 62, 75, 118, 129, 133, 156, 157
- CMB lensing** 62, 157
- COLA** COmoving Lagrangian Acceleration 109, 111–114, 133–136, 138, 148, 155, 165–168, 170, 175–177
- comoving coordinates** 10, 16, 22, 23, 25, 37, 40, 68, 74, 75, 86, 89, 90, 92, 106, 147, 166, 182, 185
- compensation** 118, 128, 132, 137
- conditional density contrast** 14
- conditional independence** 11, 71, 75, 121, 124, 161–163

- conditional pdf** 11, 14, 51, 58, 60, 67, 71, 72, 77, 136, 140, 150, 163
- conformal expansion rate** 8
- conformal time** 8, 16, 22, 23, 182
- conservative map** 151, 152, 154
- constrained likelihood** 53
- constrained simulation** 109, 110, 117, 119, 121, 122, 128, 131, 133, 134, 140, 148, 155, 178
- continuity equation** 17, 19, 25
- Cosmic Emulator** 30, 31
- cosmic time** 8
- cosmic variance** 32, 34, 118
- cosmic web** 1, 4, 29, 40, 75, 91, 110, 118, 121, 123, 131–135, 140, 147–149, 154–156, 158, 179
- cosmic web classification** 4, 24, 44, 56, 131, 133–136, 138, 140, 142, 147–150, 154, 156, 179, 181–185
- cosmological constant** 8, 20
- cosmological parameters** 8, 15, 19, 20, 22, 30, 37, 42, 62, 67, 74, 75, 80, 101, 103, 106, 125, 138, 157, 178, 185
- CosmoMC** 58
- cosmostatistics** 3, 10, 49
- Cox’s desiderata** 51, 53
- Cox-Jaynes theorem** 51
- Cromwell’s rule** 53
- cross-correlation** 32, 33, 42, 43, 75, 105, 113, 114, 129, 148, 154, 156
- curse of dimensionality** 63–66
- dark energy** 2, 8, 19, 54, 56, 118, 125–127, 157, 158
- dark matter** 2, 15, 17, 18, 40, 117–119, 125, 129, 135, 155, 156
- dark matter particles** 15, 29, 31, 32, 34, 41, 42, 68, 74, 80, 86, 87, 89, 90, 92, 95, 107, 111–113, 119, 122, 123, 125–128, 138, 166–170, 172, 173, 175, 178, 185
- dark matter void** 4, 110, 111, 117–120, 122–129, 155
- dark-energy domination** 2, 8
- data** 52, 53, 66, 68, 71, 72, 74, 75, 79, 80, 83, 85, 86, 89, 92, 110, 117, 119, 122–124, 127–129, 133–140, 142–144, 147–152, 154–158
- data assimilation** 4, 63, 155, 157, 158
- data model** 4, 54, 63, 66, 67, 69, 70, 155, 157
- decaying mode** 19–21, 23
- decision theory** 4, 149–152, 154, 156
- declination** 68, 86
- decoupling** 2
- density contrast** 9–13, 16–19, 22, 23, 30, 34, 37–41, 43, 67–69, 73, 75, 95, 97–99, 101, 103, 104, 106, 121, 122, 136, 137, 141, 142, 168, 169, 172, 173, 178, 180–182, 184, 185
- density field** 2, 4, 10, 12, 17, 19, 21–26, 29–34, 37, 41–45, 66–69, 72, 74–77, 79–86, 88, 89, 91, 92, 95–107, 109–114, 118–122, 124–126, 129, 131–136, 138, 141, 143, 147, 148, 154–156, 167–170, 177, 179, 180, 184, 185
- density profile** 117–119, 122, 125, 127–129, 180, 181
- detailed balance** 58–60
- diffusion equation** 27
- Dirac delta distribution** 13, 15, 52, 55, 67
- displacement field** 22, 23, 25, 29, 31, 37, 40, 41, 44, 112, 132, 155, 156, 166, 168, 177, 178
- DIVA** DynamIcal Void Analysis 40, 132
- divergence of the Lagrangian displacement field** 23, 29, 37–42
- drift** 74, 166, 175–178
- eigenvalue** 23, 24, 44, 132, 134, 136, 137, 141, 142, 178, 181–185
- Einstein’s equations** 8, 132
- Einstein-de Sitter universe** 20, 21
- ellipticity distribution** 117, 119, 122, 125–127, 129, 180, 181
- ensemble average** 9, 12–14
- entropy** 134, 138, 139, 142–144, 147, 148
- EPT** Eulerian perturbation theory 7, 18, 21, 25, 96, 101, 107, 132

- equation of motion** 15–17, 19, 22, 73, 74, 112, 166, 182, 183  
**equation of state** 1, 8, 18, 54, 56, 126, 157  
**ergodicity** 9, 58  
**estimator** 37, 44, 50, 52, 99, 179  
**Euler’s equation** 17, 19, 25, 26, 96  
**Euler’s method** 175  
**evidence** 52, 54, 56, 57  
**exascale computers** 3  
**excess kurtosis** 38, 40  
**expansion** 1, 2, 15–17, 19, 23, 118, 147, 157  
**exploration of the posterior** 54, 55, 62  
**extended logic** 49, 51  
**fair game** 151  
**FDA** finite difference approximation 168, 174, 178  
**filament** 4, 24, 26, 29, 44, 45, 75, 79, 83, 86, 91, 96, 99, 111, 121, 131–137, 140, 142, 145, 147–150, 152, 154, 156, 179, 181–185  
**final conditions** 40, 41, 67, 68, 71, 72, 74, 75, 77, 80–86, 88, 89, 91, 92, 97, 98, 100, 106, 109–111, 113, 114, 117, 119, 122, 128, 132–139, 141–143, 147, 151, 152, 154, 155, 157, 158, 175, 185  
**flat prior** 53  
**fluid** 2, 15, 17, 18, 22, 23, 25, 27, 96, 155, 165, 178  
**formation history** 2, 4, 63, 71, 79, 80, 86, 88, 89, 91, 92, 96, 126, 131, 133, 134, 143, 148, 155, 156  
**forward modeling** 51, 68, 74, 110, 135  
**Fourier transform** 3, 41, 161, 162, 169–171, 173, 174, 178, 184  
**free-particle approximation** 27  
**frequentist statistics** 49–53, 57, 124  
**Friedmann’s equations** 8, 16, 17, 19, 20, 167  
**frozen flow approximation** 26  
**full gravity** 29, 32, 37, 39–43, 68, 69, 95–101, 103–106, 109–111, 114, 117, 119, 121, 128, 131, 135, 148, 155  
**Gadget-2** 29, 109–114, 121, 125, 155, 174, 185  
**gain function** 150, 151, 154  
**galaxy formation** 2, 69, 118, 121, 156  
**galaxy survey** 1, 2, 4, 9, 12, 15, 29, 40, 62, 64, 66, 80, 86, 89, 95, 97, 106, 107, 117, 118, 120, 128, 129, 132, 134, 149, 155  
**galaxy void** 117, 118, 120, 122, 124–129  
**Gaussian kernel** 43, 174, 184  
**Gaussianization** 96, 97, 106  
**general relativity** 2, 7, 8, 15, 54, 56, 127, 133  
**Gibbs sampling** 60, 75  
**gravitational constant** 8  
**gravitational evolution** 1, 2, 7, 9–11, 15, 16, 18, 24, 25, 97, 110, 126, 133, 155, 156, 182  
**gravitational field** 25, 184  
**gravitational potential** 9, 16–18, 23, 25, 26, 44, 136, 157, 166–168, 173, 174, 181, 183, 184  
**Green function** 173, 174, 184  
**grf** Gaussian random field 2, 4, 10–12, 14, 41, 55, 66, 67, 74, 75, 77, 83, 86, 91, 118, 121, 122, 125, 129, 132, 134, 135, 138, 142, 143, 155, 161, 162, 177, 185  
**growing mode** 19, 21, 23, 24  
**HADES** HAmiltonian Density Estimation and Sampling 12, 66  
**halo** 2, 24, 26, 31, 38, 40, 45, 113, 119, 132, 133, 135, 141, 148, 183  
**Hamilton’s equations** 61, 62, 66, 73, 175  
**Hastings ratio** 59, 60  
**HDM** hot dark matter 2  
**Helmholtz decomposition** 43  
**high-dimensional function** 65, 89  
**high-dimensional parameter space** 53, 55, 56, 59, 60, 64, 65, 72, 73, 75, 80, 82, 89, 91, 121, 133–135, 155  
**high-order correlation function** 2, 10, 11, 14, 40, 79, 83, 86, 89, 91, 95, 96, 99, 101, 106, 119, 121, 132, 134, 135, 148  
**HMC** Hamiltonian Monte Carlo 60–63, 66, 72–74, 77, 80, 89, 121, 135, 155, 157  
**homogeneous Universe** 8, 16, 19, 64, 96, 158

- Hot Big Bang** 1, 2  
**Hubble flow** 16, 112  
**Hubble parameter** 8, 19, 20  
**Hubble radius** 15  
**hypothesis testing** 50, 54  
**inference** 49, 50, 52, 54, 62, 79, 80, 85, 89, 91, 92, 133–135, 143, 148, 154, 156, 157  
**inflation** 1, 2, 9, 10, 132, 156  
**inflaton** 1  
**information content** 2, 4, 86, 92, 95, 97, 106, 107, 135, 138, 139, 142–144, 147, 148, 156–158, 169  
**information theory** 51, 131, 134, 138, 148, 156  
**initial conditions** 1–4, 10, 15, 24, 29, 31, 32, 37, 40, 41, 43, 62, 66–69, 71–75, 77, 79–86, 88, 89, 91, 92, 97–101, 104–106, 109–111, 113, 117, 119–122, 124, 125, 128, 129, 131–135, 138, 141–144, 148, 151, 154–158, 161, 165–167, 175–178, 182, 185  
**integrated Sachs-Wolfe effect** 118, 129, 133, 157  
**interpolation** 166–168, 172–175, 178  
**invariant distribution** 58  
**inverse problem** 51, 91  
**isocurvature perturbations** 56, 157  
**Jeffreys’ priors** 53  
**Jeffreys’ scale** 57  
**Kac’s theorem** 161, 163  
**KDK** kick drift kick 74, 175  
**kick** 62, 74, 166, 168, 175–178  
**Kronecker symbol** 18, 73, 136  
**Kullback-Leibler divergence** 134, 138–140, 143, 144, 148  
**Lagrangian potential** 24, 42, 44, 178, 182  
**Lagrangian transport** 85, 89, 90, 92, 110, 122, 135, 147, 148, 158  
**large-scale structure inference** 4, 63, 66, 69, 74, 75, 79, 82, 86, 89, 90, 107, 109, 112, 117–120, 129, 131, 133–135, 148, 149, 154–157, 177  
**large-scale structure likelihood** 68, 69, 71, 75, 109, 119, 129, 135  
**leapfrog** 73, 74, 175, 176  
**lightcone** 9, 69, 157  
**likelihood** 52–54, 56, 57, 60, 68, 73, 134  
**likelihood-free methods** 56  
**linear evolution** 2, 96  
**linear growth factor** 19–21, 23, 25, 40, 73, 113, 167, 177  
**linear regime** 19, 23, 26, 30, 32, 63, 89, 109, 111, 119, 120, 132, 135, 157  
**linearly-evolving potential approximation** 26  
**Liouville’s theorem** 17, 61  
**local** 23–26, 37, 41, 69, 99, 107, 133, 169, 180  
**local Lagrangian approximations** 42  
**local tidal approximation** 26  
**log-normal distribution** 10, 12, 31, 62, 83, 91, 118, 134  
**low-pass filter** 169–171  
**LPT** Lagrangian perturbation theory 4, 7, 22, 23, 25, 29–35, 37–45, 95–103, 105–107, 110, 112, 113, 132, 135, 141, 155, 165–168, 177, 178  
**LSS** large-scale structure. 1–4, 9, 15, 29, 37, 45, 64, 66, 71, 79, 80, 82, 83, 86, 88, 89, 91, 92, 95–97, 99, 101, 106, 109, 110, 117–119, 121, 122, 126–128, 131–135, 137, 138, 141–143, 147–153, 155–157, 181  
**luminosity** 66, 68–71, 74, 79–81, 83, 86, 88, 89, 91, 121, 122, 129, 133–135, 156  
**machine epsilon** 65  
**machine learning** 51  
**marginal pdf** 11, 54, 55, 57, 58, 62, 68, 163  
**mask** 52, 66, 70, 74, 80, 86, 118, 134, 154  
**mass matrix** 61, 73, 74  
**mass resolution** 30, 106, 168, 185  
**matter domination** 2, 8, 15, 67  
**maximum-entropy** 51  
**MCMC** Markov Chain Monte Carlo 49, 56, 58–60, 65, 82, 91, 119

- mesh assignment** 34, 68, 101, 147, 166, 168, 170–174, 184
- Metropolis ratio** 59
- Metropolis update** 59, 62
- MFF** mass filling fraction 131, 133, 140, 141, 143, 146–148
- MH** Metropolis-Hastings 59, 60, 62, 65
- mildly non-linear regime** 4, 30–32, 34, 37, 63, 89, 95–97, 100, 105, 106, 109–111, 119, 120, 132, 134, 135, 155, 157
- mock catalog** 63, 74–76, 95–97, 101, 106, 118
- mode coupling** 96, 97, 112, 134, 166, 167
- model comparison** 15, 49, 50, 53, 54, 56, 57, 119
- moment** 10, 11, 15, 17, 18, 40, 96
- momentum** 17, 18, 61, 62, 96, 166–168, 173, 175–178
- MUSCLE** Multiscale spherical collapse 42, 43
- N-GenIC** 29, 177
- nested model** 57
- neutrino** 2
- Newtonian gravity** 15, 27
- NGP** nearest grid point 68, 170, 171, 173
- no-free lunch theorem** 49, 53, 58
- noise** 52, 54, 66, 69, 79, 83, 85, 89, 91, 118, 119, 121, 127–129, 135, 148, 155
- noise parameter** 66, 70–72, 75, 77, 80, 81, 83, 89, 129
- non-committal prior** 57
- non-Gaussianity** 4, 10, 30, 34, 40, 41, 56, 62, 67, 119, 121, 124, 135, 156
- non-linear approximation** 7, 25, 96
- non-linear evolution** 2, 4, 10, 23, 25, 40, 43, 66, 95–97, 101, 106, 107, 110, 119, 121, 134, 141, 155, 157
- non-linear filtering** 4, 109–113, 119, 121, 127–129, 134–136, 141, 147, 155
- non-linear regime** 12, 19, 25, 26, 32, 44, 97, 106, 107, 111, 114, 128, 131–135, 148, 149
- non-local** 21, 24, 25, 31, 34, 40–42, 69, 85, 86, 89, 90, 92, 122, 134, 174
- non-magnetic approximation** 26
- nuisance parameters** 54, 61
- number function** 68, 71, 84, 103, 117, 119, 122, 125, 126, 129, 180
- Nyquist wavenumber** 31, 111, 169, 171
- Nyquist-Shannon sampling theorem** 169
- Occam’s razor** 56, 57
- OCDM** open cold dark matter 20
- one-point distribution** 10, 12, 30, 31, 37, 40–42, 75, 95–101, 103, 106, 121, 134, 135, 155
- ORIGAMI** Order-ReversIng Gravity, Apprehended Mangling Indices 40, 132
- pancake** 24, 26, 182
- paradigms of science** 3
- parameter inference** 49, 50, 54, 56, 58
- particle realization** 29, 41, 44, 45, 68, 72, 74, 75, 86, 98, 99, 101, 103, 104, 109–114, 155, 177, 178
- partition function** 61
- path integral formalism** 96
- pdf** probability distribution function 2, 9–13, 30, 31, 37, 40, 52–54, 56–58, 60, 61, 65, 66, 75, 97–99, 101, 103, 119, 129, 134, 136–145, 147, 155, 161, 162
- peculiar velocity** 16–18, 66
- peculiar velocity flow** 17, 25
- periodic boundary conditions** 29, 74, 98, 104, 113, 122, 168, 172, 175, 185
- phase** 32, 44, 105, 126, 134, 156
- phase space** 17, 18, 40, 61, 62, 74, 119, 132, 156, 175
- photometric redshift** 52, 62, 66, 157
- physical density prior** 67, 68
- plausibility** 51
- plausible reasoning** 49, 51
- PM** particle-mesh 4, 112, 113, 165–170, 173–175, 177, 178

- Poisson equation** 17, 19, 23–27, 42, 166–168, 173, 181, 182, 184
- Poisson intensity field** 69, 70
- Poisson likelihood** 69, 71, 85, 121
- Poisson process** 69, 74, 85, 91, 138
- posterior** 4, 52–58, 63, 66, 71, 72, 74, 75, 77, 82, 86, 119, 121, 122, 124, 129, 134–136, 138–145, 147, 148, 150–152, 154–156
- posterior mean** 54, 75, 81, 83–85, 91, 92, 136, 137, 140–142
- posterior odds** 57
- posterior standard deviation** 54, 75, 81, 83, 85, 89, 91, 92, 137
- potential well** 2, 21, 95
- power spectrum** 2, 13–15, 29–34, 41, 42, 44, 62, 66, 67, 74, 75, 77, 80–83, 91, 95, 99, 100, 105, 106, 111, 112, 118, 119, 122, 125, 126, 134, 138, 177, 178, 185
- principal component analysis** 66
- prior** 12, 49, 52–54, 56, 57, 66–69, 71, 73, 75, 77, 117, 119, 121–123, 126–129, 134, 135, 137–145, 147, 148, 150, 151, 154, 156
- prior choice** 52, 53
- prior volume** 53, 57
- probability (definition)** 50
- probability theory** 4, 49–53, 149, 155
- proper prior** 53
- proposal distribution** 59, 60, 62, 65
- quantum field theory** 2, 96
- quantum fluctuation** 1, 10
- radiation domination** 2
- recombination** 2
- reconstruction** 3, 32, 62, 69, 75, 79, 92, 96, 99, 111, 114, 118, 119, 121, 123–129, 133–136, 155, 184
- redshift** 8, 29–38, 40, 41, 52, 68, 75, 80, 86, 95, 97, 98, 101–106, 110–114, 119, 134, 140, 147, 151, 154, 157, 177
- redshift-space distortions** 2, 9, 66, 69, 127, 135, 157
- reduced bispectrum** 15
- Rees-Sciama effect** 133, 157
- reionization** 106
- remapping** 4, 30–35, 95–107, 110
- remapping function** 97, 100–103
- renormalization group flow** 96
- renormalized perturbation theory** 96
- reversibility** 58, 61, 62, 74
- right ascension** 68, 86
- risk aversion** 151, 152, 154
- sample** 4, 50, 55–59, 63–65, 68–72, 74, 75, 77, 80–91, 109–113, 121–124, 129, 134–138, 140–142, 147, 148, 151, 154, 155
- sample average** 9, 13
- sampling** 55, 56, 58–61, 63–67, 71, 72, 74, 75, 77, 89, 118, 119, 121, 122, 126, 128, 129, 135, 155, 157, 169, 170
- Savage-Dickey ratio** 57
- SC spherical collapse** 24, 26, 42, 43, 96, 183
- scalar field** 1, 9, 10, 12, 136, 161, 162
- scalar part** 43, 44
- scale factor** 1, 8, 19, 20, 42, 67, 82, 85, 86, 88, 89, 91, 114, 121, 138, 147, 166, 175, 176
- SCDM standard cold dark matter** 20
- Schechter luminosity functions** 74, 80
- Schrödinger equation** 27
- Schur-complement** 163
- SDSS Sloan Digital Sky Survey** 4, 53, 56, 70, 74, 79, 80, 82, 84, 86, 89, 91, 92, 117–126, 128, 129, 131–135, 137, 139, 140, 142–144, 147–149, 151, 154, 155
- second-order growth factor** 21, 24, 73, 167, 177
- selection effects** 2, 52, 66, 68–70, 74, 79, 80, 83, 86, 89, 91, 118, 119, 121, 122, 125, 126, 129, 134–136, 140, 148, 154, 155, 157
- shape function** 169–171, 173
- sheet** 4, 24, 29, 44, 45, 79, 96, 99, 117, 131–137, 140, 142, 145, 147–150, 152, 154, 156, 179, 181–185

- shell-crossing 18, 22, 24, 26, 42, 44, 96, 97, 106, 155, 182
- shot noise 37, 85, 129, 180
- single-stream approximation 18, 26
- skewness 30, 38, 40
- sparsity 53, 64, 117–119, 121, 125–129
- spectroscopic redshift 80
- speculative map 151, 152
- statistical homogeneity 1, 2, 4, 9, 12–15, 67, 69, 135, 178
- statistical isotropy 1, 2, 4, 9, 12, 13, 15, 69, 135, 178
- statistical mechanics 61, 96
- statistical uncertainty 4, 55, 69, 79, 89, 91, 92, 105, 119, 124, 126, 127, 129, 156
- stress tensor 17–19
- structure formation 2, 4, 7, 10, 15, 18, 24, 40, 44, 54, 66–68, 71, 74, 75, 79, 86, 89, 91, 95, 96, 101, 105, 106, 109–112, 119, 121, 122, 131–134, 136, 141, 148, 149, 154, 155, 157
- structure type 44, 45, 75, 96, 99, 100, 131–145, 147–152, 154, 155, 179, 181–184
- Sunyaev-Zel'dovich effect 133, 157
- survey geometry 52, 70, 74, 75, 79, 83, 86, 89–92, 110, 119, 121, 122, 125, 126, 129, 135, 137, 140, 148, 151, 154, 155
- survey response operator 66, 70, 74, 83, 122, 123, 140, 143, 147
- symplecticity 61, 62, 74, 175
- systematic uncertainty 55, 79, 82, 86, 89, 119, 126
- T-web 132–138, 142, 143, 148, 150, 154, 179, 181–185
- three-point correlation function 34, 35, 37, 86, 95, 100, 103, 105, 106, 121, 135, 155
- tidal effects 24, 34, 126, 135, 183
- tidal field 126, 131–133, 137, 154, 156, 182, 183
- tidal tensor 22, 132, 134, 136, 137, 141, 142, 147, 148, 181, 182, 184, 185
- transfer function 98, 100, 101, 103, 104, 106, 112
- transition probability 58–60
- trispectrum 15
- TSC triangular shaped cloud 170, 171, 173
- two-point correlation function 2, 12–14, 31, 32, 34, 44, 83, 95, 100, 103, 105, 106, 111, 118, 121, 122, 134, 135, 155
- uncertainty quantification 50, 52, 53, 55, 63, 75, 76, 79, 80, 82, 85, 89, 91, 92, 110, 112, 117, 119, 121, 122, 124, 129, 131, 133–136, 138, 148, 155
- utility function 150, 151
- V-web 132, 150, 184
- vector part 41, 43, 44
- velocity dispersion 17, 18
- velocity field 9, 16, 18, 19, 21, 22, 24–26, 75, 80, 86, 87, 91, 120, 128, 133, 134, 155, 157, 184
- velocity potential 25, 26, 96
- velocity profile 128
- velocity shear field 132, 184
- VFF volume filling fraction 44, 45, 99, 131, 133, 135, 140, 141, 143, 145, 147, 148, 150
- VIDE Void IDentification and Examination toolkit 119, 121–124, 126, 127, 129, 155, 179–181
- viscosity 18, 26, 27, 96
- Vlasov equation 17, 18
- Vlasov-Poisson system 17, 18, 32, 96, 110, 181
- void 4, 24, 29, 38–41, 44, 45, 86, 91, 92, 96, 99, 100, 111, 117–129, 131–137, 140, 142, 145, 147–152, 154–156, 179–185
- void hierarchy 1, 117, 118, 121, 128, 129, 132, 134, 180
- void-in-cloud 43, 128
- void-in-void 128
- Voronoi tessellation 121, 122, 179–181
- vorticity 19, 23–25
- watershed transform 121, 180
- WDM warm dark matter 157
- weak gravitational lensing 118, 129, 133, 157
- white noise 177

- 
- Wick's theorem** 11, 14
- Wiener filter** 11, 75, 77
- WMAP-7** 30, 101
- ZA** Zel'dovich approximation 23–27, 29–32, 34, 35, 37, 38, 40, 41, 43, 44, 96, 98, 99, 101–105, 112, 155, 168, 177, 178, 182
- ZARM** Zel'dovich approximation remapped 30–32, 34, 35, 103, 104
- ZOBOV** 119, 121, 122, 179, 180