	Turbulence	Financial Markets
Elementary fluctuating quantity that needs to be described or studied statistically	Velocity difference at the same moment of time between two locations in space, $\delta\vec{v} = \vec{v}(\vec{x} + \delta\vec{x}, t) - \vec{v}(\vec{x}, t)$.	Price differences between two moments of time, $\delta p = p(t + \delta t) - p(t)$.
Independent variable(s)	Location is space $\vec{x}$ and moment of time t.	Time t.
Energy transfer or distribution across various scales	In 3-dimensional (and 1-dimensional) case the energy is injected at the Large or Box Scale and through non-linear interactions gets distributed across all scales all the way through the smallest or Dissipation or Viscous Scale. 2-dimensional case is having an inverse energy transfer.	"Information" is injected into the system at a Large time Scale and through individual traders-agents interactions with one another via trading, gets transmitted across all time scales, all the way to the smallest Limit Order Book Event time Scale.
Relationship to some exact "equations of motion"	The exact equations of motion are known, however, that does not help in solving the problem, which is too complex to be solved precisely. Despite that knowledge, strictly speaking, this physics problem remains to be analytically unsolved.	The exact equations of motion are not known and the exact analytical description is not yet exactly known (may never be).
Non-Gaussian behavior of fat tails of two-point probability distribution functions	Strongly pronounced for strong turbulence regimes. Algebraic decay of the probability density function tails.	Strongly pronounced for highly liquid, mature markets. Algebraic decay of the probability density function tails.
Auto-correlation and energy spectrum	$\delta\vec{v}$ is anti-correlated with the power law energy spectrum: $E(k) \propto k^{-5/3}$.	For δp - nearly absent correlations, and a very close to a Random Walk power law energy spectrum: $E(\omega) \propto \omega^{-2}$.
Meaning of the second order moment of the fluctuating quantity	(Kinetic) energy of the turbulent liquid.	Volatility.
Large scale structures and	Deviations from Gaussian manifest themselves through coherent	Deviations from Gaussian manifest themselves in

intermittency	structures, shock-waves for 1-dimensional case and coherent vortices for 2- and 3-dimensional cases.	higher than normal frequency of gaps or shocks (up- or down-).
Stationary process?	Non-stationary at small time scales but asymptotically stationary at long time scales.	Non-stationary at small time scales but asymptotically stationary at long time scales.
Convergence to a Gaussian	As the time separation δt becomes increasingly larger.	As the time separation δt becomes increasingly larger.
Power law behavior	Yes.	Yes.