Advanced topics in stochastic processes

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Possible calendar:
First Part
Tuesday 7, 14 Nov. from 14:30 to 16:30 - Thursday 9, 16 Nov. from 14:30 to 16:30
Second Part
Tuesday 21, 28 Nov. from 10.30 to 12.15 - Thursday 23, 30 Nov. from 10.30 to 12.15
Third Part
Tuesday 5, 12 Dec. from 10.30 to 12.15 - Thursday 7, 14 Dec. from 10.30 to 12.15

For other information: please visit http://www.dfa.unipd.it/index.php?id=1680

Course contents:
First part: Amos Maritan
1. Stochastic differential equations and Ito calculus
2. Power spectrum and amplification of stochastic noise
3. Multivariate Ornstein-Uhlenbeck process
4. Feynman Kac-formula
5. Kramers-Moyal expansion, van Kampen size expansion

Second Part: Jacopo Grilli
1. Introduction to Random Matrix and its application
2. Replica Trick for Wigner matrix. Replica caveats and super symmetric method.
5. Doe, resolvent and techniques for non-hermitian matrices (with quaternion algebra)

Third Part: Samir Suweis
1. Introduction: complexity-stability paradox. Lotka-Volterra models and demographic stochasticity
3. Ecological networks and a generalization of the Voter Model
4. Application of Van Kampen expansion size in Ecology

Bibliography