1143-65-368 **Mahboub Baccouch*** (mbaccouch@unomaha.edu), 6601 university Dr. N, DSC 233, omaha, NE 68182-0001. *A finite difference method for stochastic second-order boundary-value problems driven by additive white noises.*

In this talk, we develop and analyze a finite difference method for scalar stochastic two-point boundary-value problems (SBVPs) driven by additive white noises. We first introduce an approximate SBVP by replacing the white noise process with its piecewise constant approximation. We prove that the solution of the modified SBVP converges to the solution of the original SBVP. The order of convergence is proved to be two in the mean-square sense. The new approximate SBVP is shown to have better regularity which facilitates the convergence proof for the proposed scheme. We then apply the standard finite difference method for deterministic SBVPs to approximate the solution of the new stochastic SBVP. Convergence analysis is presented for the numerical solution based on the standard finite difference method. In particular, we prove that the numerical solution converges at $\mathcal{O}(h^2)$ in the mean-square sense, when the second-order accurate three-point formulas to approximate the first and second derivatives are used. Finally, we present several numerical examples to validate the obtained analytical results. (Received August 19, 2018)