



Analytical Modeling of Nonlinear Propagation in a Strongly Dispersive Optical Communication System

[Pontus Johannisson](#)

(Submitted on 10 May 2012 (v1), last revised 1 Jun 2012 (this version, v2))

Recently an analytical model was presented that treats the nonlinear signal distortion from the Kerr nonlinearity in optical transmission systems as additive white Gaussian noise. This important model predicts the impact of the Kerr nonlinearity in systems operating at a high symbol rate and where the accumulated dispersion at the receiver is large. Starting from the suggested model for the propagating signal, we here give an independent and different calculation of the main result. The analysis is based on the Manakov equation with attenuation included and a complete and detailed derivation is given using a perturbation analysis. As in the case with the published model, in addition to assuming that the input signal can be written on a specific form, two further assumptions are necessary; the nonlinearity is weak and the signal-noise interaction is neglected. The result is then found without any further approximations.

Comments: Results are unchanged, but the relation to the results in Ref. [4] is made clear

Subjects: **Optics (physics.optics)**

Cite as: [arXiv:1205.2193](#) [physics.optics]

(or [arXiv:1205.2193v2](#) [physics.optics] for this version)

Submission history

From: Pontus Johannisson [[view email](#)]

[v1] Thu, 10 May 2012 08:33:24 GMT (24kb)

[v2] Fri, 1 Jun 2012 12:14:39 GMT (24kb)

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