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$_v1-$
$cropGeneralstructureofacoherentopticalcommunicationsystem$
$_setup, arenowreviewed.Atthetransmittertheinputdatabitsareprocessedbya DSPchain, whosetasksare:$
$toencodetheinformationbitstoprovideFEC, tomaptheseBitstopredefinedsymbols, andfinallytoproduceatime-$
$shapeddigitalwaveform.Thiswaveformisfedtoa DAC, whichconvertsitfromthedigitaltotheanalogdomain.Theresultin$
$modulatoremployinginterferometers.Themodulatedopticalfieldistransmittedthroughthefiber-$
$opticchannel, whichcanbecomposedofseveralspansofopticalfiberinterleavedwithopticalamplifiers(usually EDFAorRa$
$electricalchannel, demodulatesthedigitalwaveform, andfinallyperformserrorcorrectioninordertoretrievetheinformat$
?
?
?
!
$_N FDM_s ystem.$
$_{(,)}^{O}$
?
?

$$\frac{\partial(,)}{\partial} = -2\partial^2(,)\partial^2 + |(,)|^2(,) \tag{1}$$

$0 \leq \leq$
L
L
??

$$= \sqrt{P}, \qquad = T_0, \qquad = - \tag{2}$$

$P =$
$\underline{\underline{||}}/(T_0^2)$
$\overline{\overline{2T_0^2/||}}$
T_0

$$\frac{\partial}{\partial} = \pm\frac{\partial^2}{\partial^2} + 2||^2 \tag{3}$$

$\tilde{z}$
P
T_0
$_normalized_p m.$
$_normalized_p mcorrespondtothecasesofnormal()andanomalous()dispersionregimes.Intherestofthisthesis, onlytheanon$
$[2]+$
$2^2.$(4)
$_normalizedusedinoneoftheworksthatpopularizedtheNFTintherecentyears[?], andalsoalsoappearinginotherworkssuch$
$normalizedNLSEusedin[?]differsfromeq:NLSEbyaminusinthefirstterm.$

$$= -12[2]-^2 \tag{5}$$

$$= \sqrt{P}, \qquad = T_0, \qquad = \tag{6}$$

$P =$
$\underline{\underline{||}}/(T_0^2)$
$\overline{\overline{T_0^2/||}}$
T_0
$_of_variables_N LSEhasanadditionalminusandafactor2inthenormalizationofthespacecoordinate.Someoftheworkswhere$
?
?
?

$$= -[2]-2^2 \tag{7}$$

$\underline{\underline{_of_variables_N LSEbutreplacingthechangeofvariable\rightarrow}}$
/
$_comparison_m ansoor, tab:normalizations_comparison_a grawal, andtab:normalizations_comparison_y angattheendofthec$
$_normalizedbelongstoaclassofnonlinearPDEthatcanbesolvedexactly, i.e., itispossibletofindanalyticalsolutions, byamat$
$_normalized[?].Theparallelismbetweenthetwomethodshasdrivensomeauthorstorenamethe IST as NFT[?], whichisthena$
?

$$= -[2], (,_0) = [0] \tag{8}$$

$[0]$
$_0$

$$\mathcal{Q}(w,) = w^2\mathcal{Q}(w,), \mathcal{Q}(w,_0) = \mathcal{Q}_0(w) \tag{9}$$

$\mathcal{Q}(w,) =$
$F\{\}$
$\mathcal{Q}_0(w)$
$_medium_f domainintheinterval_0,]$

$$\mathcal{Q}(w,) = \exp\left(iw^2\right)\mathcal{Q}(w,_0) \tag{10}$$

$_method-$
$cropSchemeoftheFouriermethodforsolvingtheIVPforlinearPDE$