Journal of Statistical and Mathematical Sciences
ISSN 3065-100X
Volume 13 Issue 3
July- September 2025
Impact Factor: 8.99
Enquiry: contact@continentalpub.online
Published by Continental Publication | http://continentalpub.online/index.php/jsms

GEOMETRIC INSIGHTS INTO NORMAL CR-SUBMANIFOLDS IN QUASI-KÄHLERIAN MANIFOLDS

Dr. Li Wei Jun and Dr. Zhang Min Hao
School of Mathematics and Statistics, Changsha University of Science and Technology, Changsha, Hunan, P. R. China.

***Abstract**: This paper delves into the realm of differentiable manifolds and morphisms, emphasizing their differentiability of class C∞. We introduce fundamental concepts, such as the tangle bundle T(M) and the algebra of differentiable functions F(M) defined on the real n-dimensional connected differentiable manifold M. Furthermore, we explore the module of differentiable sections of a vector bundle H, denoted as Γ(H). This investigation sheds light on the intricate interplay between differentiable structures within the realm of manifold theory.*
***Keywords:** Differentiable manifolds, Tangle bundle, Algebra of differentiable functions, Differentiable sections, Vector bundle*

1 Introduction

In this paper, all manifolds and morphisms are supposed to be differentiable of class $C^{□}$. Let M be a real n-diemensional connected differentiable manifold. $T(M)$ and $F(M)$ are respectively the tangle bundle to M and the algebra of differentiable functions on M. Also, we denote by $□(H)$ the module of differentiable sections of a vector bundle H.
A linear connection on M is a mapping

$□: □(TM)□□(TM) □□(TM); (X, Y) □□ _X Y$
satisfying the following conditions

(1)$□_{f(X)□Y}(Z) □ f □_X Z □□_Y Z$,

(2) $□_X(fY □ Z) □ f □_X Y □(Xf)Y □□_X Z$, for any $f □ F(M)$ and $X, Y, Z □□(TM)$. The operetor $□_X$ is called the covariant differentiation with respect to X. Thus for any tensor field □ of type (0, s) or (1, s) we define the covariant differentiation $□_X□$ of □ with respect to X by s

DOI:https://doi.org/10.5281/zenodo.15914034

$$(\bar\nabla_X \omega)(X_1, X_2, \ldots, X_s) = \bar\nabla_X(\omega(X_1, X_2, \ldots, X_s)) - \sum_{i=1}^{s} \omega(X_1, \ldots, \bar\nabla_X X_i, \ldots, X_s), \quad (1.1)$$

for any $X_i \in \Gamma(T\bar M)$, $i = 1, 2, \ldots, s$. A linear connection $\bar\nabla$ on $\bar M$ is said to be a Riemannian connection if Riemannian metric g satisfying

$$Xg(Y, Z) = g(\bar\nabla_X Y, Z) + g(Y, \bar\nabla_X Z), \quad (1.2)$$

for any $X, Y \in \Gamma(T\bar M)$. An almost complex structure on $\bar M$ is a tensor field J of type (1, 1) on $\bar M$ such that at every point $x \in \bar M$ we have $J^2 = -I$, where I denotes the identify transformation of $T_x \bar M$. A manifold $\bar M$ endowed with an almost complex structure is called an almost complex manifold. The covariant derivative of J is defined by

$$(\bar\nabla_X J)Y = \bar\nabla_X JY - J\bar\nabla_X Y, \quad (1.3)$$

for any $X, Y \in \Gamma(T\bar M)$. More, we define the torsion tensor of J or the Nijenhuis tensor of J by

$$[J, J](X, Y) = [JX, JY] - [X, Y] - J[JX, Y] - J[X, JY], \quad (1.4)$$

for any $X, Y \in \Gamma(T\bar M)$, where $[X, Y]$ is the Lie bracket of vector fields X and Y, that is, $[X, Y] = \bar\nabla_X Y - \bar\nabla_Y X$. A Hermitian metric on an almost complex manifold $\bar M$ is a Riemannian metric g satisfying

$$g(JX, JY) = g(X, Y), \quad (1.5)$$

for any $X, Y \in \Gamma(T\bar M)$. An almost complex manifold endowed with a Hermitian metric is said to be an almost Hermitian manifold.

Definition 1.1([3]). An almost Hermitian manifold $\bar M$ with Levi-Civita connection $\bar\nabla$ is called a quasi Kaehlerian manifold if we have

$$(\bar\nabla_X J)Y + (\bar\nabla_{JX} J)JY = 0, \quad (1.6)$$

for any $X, Y \in \Gamma(T\bar M)$.

Definition 1.2([1]). An almost Hermitian manifold $\bar M$ with Levi-Civita connection $\bar\nabla$ is called a Kaehlerian manifold if we have

$$\bar\nabla_X J = 0, \quad (1.7)$$

for any $X \in \Gamma(T\bar M)$. Obviously, a Kaehlerian manifold is a quasi Kaehlerian manifold. Let M be an m dimensional Riemannian submanifold of an n-dimensional Riemannian manifold $\bar M$. We denote by $TM^\perp$ the normal bundle to M and by g both metric on M and $\bar M$. Also, we denote by ∇ the Levi-Civita connection on

Journal of Statistical and Mathematical Sciences
Vol. 13 No. 3 | Imp. Factor: 8.99
DOI:https://doi.org/10.5281/zenodo.15914034

$\bar{M}$, denote by □ the induced connection on M , and denote by □□ the induced normal connection on M .

Then, for any X, Y □□(TM) we have □ $_XY$ □□ $_XY$ □ $h(X, Y)$, (1.8) where h: □(TM)□□(TM) □□(TM□) is a normal bundle valued symmetric bilinear form on □(TM) . The equation (1.8) is called the Gauss formula and h is called the second fundamental form of M . Now, for any

X □□(TM) and V□□(TM□) we denote by □A_VX and □□$_XV$ the tangent part and normal part of □$_XV$ respectively. Then we have □ $_XV$ □□A_VX □□□$_XV$. (1.9)

Thus, for any V□□(TM□) we have a linear operator, satisfying

$g(A_VX, Y)$ □ $g(X, A_VY)$ □$g(h(X, Y), V)$. (1.10)

The equation (1.9) is called the Weingarten formula. An m -dimensional distribution on a manifold M is a mapping

D defined on M , which assignes to each point x of M an m -dimensional linear subspace D_x of T_xM . A vector

field X on M belongs to D if we have X_x □D_x for each x□M . When this happens we write X □□(D). The

distribution D is said to be differentiable if for any x□M there exist m differentiable linearly independent vector fields X_i □□(D) in a neighborhood of x . From now on, all distributions are supposed to be differentiable of class

$C^{\square}$. Definition 1.3([1]). Let $\bar{M}$ be a real n -dimensional almost Hermitian manifold with almost complex structure

J and with Hermitian metric g . Let M be a real m -dimensional Riemannian manifold isometrically immersed in

$\bar{M}$. Then M is called a CR-submanifold of $\bar{M}$ if there exist a differentiable distribution D: x□D_x□T_xM , on M satisfying the following conditions: (1)D is holomorphic, that is, $J(D_x)$ □D_x , for each x□M , (2)the complementary orthogonal distribution $D^{\square}$: x □ $D_x^{\square}$ □ T_xM , is anti-invariant, that is, $J(D_x^{\square})$ □ T_xM □, for each x□M . Now let M be an arbitrary Riemannian manifold isometrically immersed in an almost Hermitian

manifold $\bar{M}$. For each vector field X tangent to M , we put JX □□X □□X , (1.11)

where □X and □X are respectively the tangent part and the normal part of JX . We denote by P and Q respectively the projection morphisms of TM to D and $D^{\square}$, that is,

X □ PX □QX , (1.12)

for any X □□(TM) . Then we have

□X □ JPX (1.13)

□X □ JQX , (1.14)

and □² □□P （1.15）

for any X □□(TM) . Moreover，we have

and

□³ □□□ 0 . （1.16）

Next, for each vector field V normal to M , we put

JV □ BV □CV , （1.17）

where BV and CV are respectively the tangent part and the normal part of JV .

We take account of the decomposition TM □ D□D□ □JD□ □□ . Obviously, we have

□X □□(D)，□X □□(JD□)，BV□□(D□) and CV □□(□), for any X □□(TM) and V □□(JD□ □□) . Further, we obtain B□□□□□Q .

The covariant derivative of □ is defined by

(□X□)Y □□X□Y □□□XY , (1.18)

for any X，Y □□(TM). On the other hand, the covariant derivative of □ is defined by

(□ X□)Y □□□X□Y □□□ X Y , (1.19)

for any X，Y □□(TM). The exterior derivative of □ is given by

d□(X，Y) □ $\frac{1}{2}${□□X□Y □□Y□□X □□([X，Y])}, (1.20)

for any X，Y □□(TM).

Remark: The more details of exterior derivative is founed in [2]. The Nijenhuis tensor of □ is defined by [□，□](X，Y) □[□X，□Y]□□²[X，Y]□□[□X，Y]□□[X，□Y], (1.21)

for any X，Y □□(TM), where [X，Y] is the Lie bracket of vector fields X and Y . We define two the tensor fields S and S* respectively by S(X，Y) □[□，□](X，Y)□2Bd□(X，Y), (1.22) and S*(Y，X) □ (LY□)X □[Y，□X]□□[Y，X], (1.23) for any X，Y □□(TM). Definition 1.4([1]). The CR-submanifold M is said to be normal if

S(X，Y) □ 0 , (1.24)

for any X，Y □□(TM). Definition 1.5. The CR-submanifold M is said to be mixed normal if

S(X，Y) □ 0 , (1.25)

for any X □□(D)，Y□□(D□) .

2 Main Results

Lemma 2.1. Let M be a quasi Kaehlerian manifold. Then we have

(□XJ)Y □(□YJ)X □ $\frac{1}{2}$J[J，J](X，Y), (2.1)

for any X，Y □□(TM) .

Proof: For any X，Y □□(TM) . From (1.4) and (1.3) we acquire

Journal of Statistical and Mathematical Sciences
Vol. 13 No. 3 | Imp. Factor: 8.99
DOI:https://doi.org/10.5281/zenodo.15914034

$[J, J](X, Y) \square (\square_{JX} J)Y \square (\square_{JY} J)X \square J(\square_Y J)X \square J(\square_X J)Y$. (2.2)

Using (2.2), (1.6) and (1.3) we have

$[J, J](X, Y) \square (\square_X J)JY \square (\square_Y J)JX \square J(\square_Y J)X \square J(\square_X J)Y$

$\square\ 2J((\square_Y J)X \square (\square_X J)Y)$. (2.3)

(2.3) **follows that (2.1) holds.** **Q.E.D.**

Lemma 2.2. Let M be a quasi Kaehlerian manifold. Then we have

$(\square_{JX} J)Y \square (\square_{JY} J)X \square \frac{1}{2}[J, J](X, Y),$ (2.4)

for any $X, Y \square\square(TM)$. Proof: For any $X, Y \square\square(TM)$. From (1.6) we get

$(\square_{JX} J)Y \square (\square_{JY} J)X \square\square(\square_{JX} J)J^2 Y \square (\square_{JY} J)J^2 X$

$\square (\square_X J)JY \square (\square_Y J)JX$. (2.5)

Using (1.3) in (2.5) we obtain

$(\square_{JX} J)Y \square (\square_{JY} J)X \square\square J((\square_X J)Y \square (\square_Y J)X).$ (2.6)

(2.4) **comes from (2.6).** **Q.E.D.**

Lemma 2.3. Let M be a quasi Kaehlerian manifold. Then we have

$(\square_X \square)Y \square A_{\square Y} X \square Bh(X, Y) \square\square_{\square X} Y \square\square\square_{\square X} \square Y$

$\square Bh(\square X, \square Y) \square\square A_{\square Y} \square X \square B \square_{\square} {}^{\square}{}_X \square Y$, (2.7)

$(\square X \square)Y \square\square h(X, \square Y) \square Ch(X, Y) \square h(\square X, Y) \square\square\square_{\square X} \square Y$

$\square Ch(\square X, \square Y) \square\square A_{\square Y} \square X \square C \square_{\square} \square_X \square Y$, (2.8)

for any $X \square\square(D), Y \square\square(TM)$.

Proof: For any $X \square\square(D), Y \square\square(TM)$. Using (1.6) and (1.3), we have

$(\square_X JY \square J \square_X Y) \square (\square\square_{JX} Y \square J \square_{JX} JY) \square 0$. (2.9)

Taking into account (1.11), (2.9) becomes

Journal of Statistical and Mathematical Sciences
Vol. 13 No. 3 | Imp. Factor: 8.99
DOI:https://doi.org/10.5281/zenodo.15914034

(□ X□Y □□ X□Y)□ J□ X Y □□□X Y □ J(□□X□Y □□□X□Y) □ 0 . (2.10)

Taking account of (1.8) and (1.9), (2.10) changes into

□X□Y □h(X, □Y)□A□Y X □□□X□Y □J□XY □Jh(X, Y)□□□XY □h(□X, Y)

□J□□X□Y □Jh(□X, □Y)□JA□Y□X □J□□□X□Y □ 0. (2.11)

According to (1.11) and (1.17), (2.11) turns into

□ X□Y □ h(X, □Y)□ A□Y X □□□X□Y □□□ X Y □□□ X Y □ Bh(X, Y)□Ch(X, Y)

□□□X Y □ h(□X, Y)□□□□X□Y □□□□X□Y □ Bh(□X, □Y)□Ch(□X, □Y)

□□A□Y□X □□A□Y□X □B□□□X□Y □C□□□X□Y □ 0 . (2.12)

By comparing to the tangent part and the normal part in (2.12), we get

□ X□Y □ A□Y X □□□ XY □ Bh(X, Y)□□□XY □□□□X□Y □ Bh(□X, □Y)

□□A□Y□X □B□□□X□Y □ 0 (2.13)

And

h(X, □Y)□□□X□Y □□□XY □Ch(X, Y)□h(□X, Y)□□□□X□Y □Ch(□X, □Y)

□□A□Y□X □C□□□X□Y □ 0. (2.14)

By (2.13) and (1.18) we have (2.7). Also, by (2.14) and (1.19) we get (2.8). Q.E.D.

Lemma 2.4([1]). Let M be a CR-submanifold of an almost Hermitian manifold $\bar{M}$. Then we have

$S(X, Y)$ □ (□□X□)Y □(□□Y□)X □□{(□Y□)X □(□ X□)Y}□ B{(□ X□)Y □(□Y□)X},

(2.15) for any X, Y □□(TM).

Lemma2.5. Let M be a CR-submanifold of a quasi Kaehlerian manifold$\bar{M}$. Then we have

$\bar{S}(X, Y)$ □ A□Y□X □□A□Y X □A□X□Y□□A□XY □((□□XJ)Y □(□□YJ)X) ^{T}

□ $\frac{1}{2}$□(J[J, J](X, Y))^T □ $\frac{1}{2}$B(J[J, J](X, Y)) □ , (2.16)

for any X, Y □□(TM).

Proof: For any X, Y □□(TM). Taking into account (1.3), (1.11), (1.8), (1.9) and (1.17), we have

(□ XJ)Y □□ X(□Y □□Y)□ J(□ X Y □ h(X, Y))

□□ X□Y □ h(X, □Y)□ A□Y X □□□X □Y

□□□XY□□□XY □Bh(X, Y)□Ch(X, Y) . (2.17)

By comparing to the tangent part and the normal part in (2.17), we obtain

((□ XJ)Y)^T □□ X□Y□A□Y X □□□ X Y □Bh(X, Y) (2.18)

and

((□ XJ)Y)□ □ h(X, □Y)□□□X□Y □□□ X Y □Ch(X, Y) . (2.19)

Combining (1.18) and (2.18), we have

DOI:https://doi.org/10.5281/zenodo.15914034

(□ $_X$□)Y □ $A_{□Y}X$ □$Bh(X, Y)$□((□ $_X J)Y)^T$.   (2.20)
Combining (1.19) and (2.19), we get

(□ $_X$□)Y □□$h(X,$ □$Y)$□ $Ch(X, Y)$□((□ $_X J)Y)$ □.   (2.21)
Taking account of (2.20) and (2.21), (2.15) becomes

$S(X, Y)$ □ $A_{□Y}$□X □((□$_{□X}J)Y)^T$□$A_{□X}$□Y □((□$_{□Y}J)X)^T$□□$A_{□X}Y$ □□((□$_Y J)X)^T$

□□$A_{□Y}X$ □□((□$_X J)Y)^T$□B((□$_X J)Y)$□ □B((□$_Y J)X)$□ .   (2.22)
Combining (2.22) and (2.1), we obtain our conclusion (2.16).

Theorem2.1. Let M be a CR-submanifold of a quasi Kaehlerian manifold M . Then M is normal if and only if we have

0 □ $A_{□Y}$□X □□$A_{□Y}X$ □$A_{□X}$□Y□□$A_{□X}Y$□((□$_{□X}J)Y$ □(□$_{□Y}J)X)^T$

□ $\frac{1}{2}$□($J[J, J](X, Y))^T$□ $\frac{1}{2}B(J[J, J](X, Y))$ □,   (2.23)
for any X, Y □□(TM).
Proof: Taking account of Definition 1.4 and Lemma2.5, our conclusion holds.   Q.E.D. Corollary2.1. Let M be a

CR-submanifold of a Kaehlerian manifold M . Then M is normal if and only if we have
$A_{□Y}$□X □□$A_{□Y}X$ □$A_{□X}$□Y □□$A_{□X}Y$ □ 0,   (2.24)

for any X, Y □□(TM). Proof: Since a Kaehlerian manifold M satisfies

□ $_X J$ □ 0, $[J, J](X, Y)$ □ 0 ,
for any X, Y □□(TM), taking account of Theorem2.1, Corollary2.1 holds.   Q.E.D.

Corollary2.2(Bejiancu[1]). Let M be a CR-submanifold of a Kaehlerian manifold M . Then M is normal if and only if we have $A_{□Y}$□X □□$A_{□Y}X$,   (2.25)

for any X □□(D), Y□□($D^□$) . Theorem2.2. Let M be a CR-submanifold of a quasi Kaehlerian manifold M
and $[J, J](X, Y)$□□(□) ,   (2.26) for any X, Y
□□(TM). Then M is normal if and only if we have
$A_{□Y}X$ □□$_{□X}Y$□□($D^□$)   (2.27)
and
$h(X, Y)$□□(□),   (2.28)
for any X □□(D), Y□□($D^□$) .
Proof: For any X □□(D), Y□□($D^□$) . By using (2.26) in (2.16) we obatin

$S(X, Y)$ □ $A_{□Y}$□X □□$A_{□Y}X$ □((□$_{□X}J)Y)^T$.   (2.29)
Taking into about (1.8), (1.9), (1.11) and (1.17), (1.3) becomes

DOI:https://doi.org/10.5281/zenodo.15914034

(□□XJ)Y □□A□Y□X □□□□X□Y □□□□XY□□□□XY □Bh(□X, Y)□Ch(□X, Y). (2.30)
By comparing to the tangent part and the normal part in (2.30), we get

((□□XJ)Y)^T □□A□Y□X □□□□XY □Bh(□X, Y) . (2.31)
From (2.29) and (2.31), we obtain
S(X, Y) □□□A□YX □□□□XY □ Bh(□X, Y). (2.32)

Suppose M is normal CR-submanifold of M . For any X □□(D), Y□□(D□) , then from (2.32) and Definition1.4 we have □(A□YX □□□XY) □ 0 (2.33)
And Bh(□X, Y) □ 0. (2.34)
From (2.33) we obtain (2.27), correspondingly, from (2.34) we get (2.28). Conversely, if (2.27) and (2.28) are sastified.
Now, we shall prove S □ 0 by means of the decomposition TM □ D□D□ . First, for any
X □□(D), Y□□(D□) , from (2.27) we obtain (2.33), correspondingly, from (2.28) we get (2.34). Taking account of (2.33) and (2.34), (2.32) becomes S(X, Y) □ 0, □X □□(D), Y□□(D□). Next, for any X, Y □□(D) , by

using (2.26), (2.16) changes into S(X, Y) □ ((□□XJ)Y)^T □((□□YJ)X)^T

□ ((□JXJ)Y □(□JYJ)X)^T . (2.35)
From (2.4) and (2.26), (2.35) becomes S(X, Y) □ 0, □X, Y □□(D) . Finally, for any X, Y□□(D□)
, in
accordance with (2.26), (2.16) changes over S(X, Y) □□□A□YX □□A□XY □□(D) . (2.36)
□Z □□(D), on the basis of (2.36), (1.11) and (1.10), we have
g(S(X, Y), Z) □ g(□□A□YX, Z)□g(□A□XY, Z)
□ g(h(X, □Z), □Y)□ g(h(Y, □Z), □Y) . (2.37)
Using (2.28) in (2.37), we get
g(S(X, Y), Z) □ 0. (2.38)
That is, S(X, Y) □ 0, □X, Y □□(D) .
From the above three conclusions we know S(X, Y) □ 0 , for any X, Y □□(TM) . Thus, the CR-

submanifold M is normal. Q.E.D. Theorem2.3. Let M be a CR-submanifold of a quasi Kaehlerian manifold M

with following conditions satisfing □XY□□(D)(2.39)

And h(X, Y)□□(□), (2.40)
for any X □□(D), Y□□(D□) .Then M is mixed normal if and only if we have
S*(Y, X) □0, (2.41)
for any X □□(D), Y□□(D□) .
Proof: For any X □□(D), Y□□(D□) . According to (1.18), (2.15) becomes
S(X, Y) □□(□[X, Y]□[□X, Y])□B(□X□)Y □B(□Y□)X . (2.42)
Taking into account (1.19), (2.8) and B□C □ 0 , (2.42) changes into

$S(X, Y)$ □□(□$[X, Y]$□$[$□$X, Y]$)□$Bh($□$X, Y)$□B□$A_{□Y}$□X □B□□$_Y X$. (2.43)

Taking account of (1.23), (2.40) and B□□□□Q , (2.43) changes over

$S(X, Y)$ □□$S^*(Y, X)$□$QA_{□Y}$□X □ Q□$_Y X$. (2.44)

□U□□$(D^□)$, combining (1.12), (1.10) and (2.40), we have $g(QA_{□Y}$□$X, U)$ □ $g(A_{□Y}$□$X, U)$
□ $g(h($□$X, U),$ □$Y)$ □ 0. (2.45)

(2.45) leads to $QA_{□Y}$□X □ 0, □X □□(D), Y □□$(D^□)$. (2.46)

Combining (2.44) and (2.46), we get $S(X, Y)$ □□$S^*(Y, X)$□Q□$_Y X$, □X □□(D), Y□□$(D^□)$. (2.47)

Suppose M is mixed normal CR-submanifold of $\bar{M}$. For any X□□(D), Y□□$(D^□)$, then from (2.47) it follows

□$S^*(Y, X)$ □ 0 (2.48)

and

Q□$_Y X$ □ 0 . (2.49)

Based on (2.48) we obtain

$S^*(Y, X)$□□$(D^□)$, (2.50)

for any X□□(D), Y□□$(D^□)$. On the other hand, taking into account (2.39) and (2.49), (1.23) becomes

$S^*(Y, X)$ □□$_Y$□X □□$_{□X} Y$ □□$[Y, X]$□□(D) , (2.51)

for any X□□(D), Y□□$(D^□)$. Taking account of (2.50) and (2.51), we get that (2.41) holds.

Conversely, if (2.41) is sastified. For any X □□(D), Y□□$(D^□)$, combinning (1.15) and (1.12), (1.23) changes into $S^*(Y,$ □□$X)$ □$[Y, X]$□□$[Y,$ □□$X]$ □$P[Y, X]$□□$[Y,$ □□$X]$□$Q[Y, X]$. (2.52)

By using (2.41) in (2.52), we have $Q[Y, X]$□ 0, □X □□(D), Y□□$(D^□)$. (2.53)

From (2.53) and (2.39), we obtain Q□$_Y X$ □ 0, □X □□(D), Y□□$(D^□)$. (2.54)

Combining (2.41) and (2.54), (2.47) becomes $S(X, Y)$ □ 0, □X □□(D), Y□□$(D^□)$. (2.55)

Relying on Definition 1.5, M is mixed normal. Q.E.D.

References

Aurel Bejancu, Geometry of CR-submanifolds, Reide Publishing Company, USA(1985), pp. 1-62

Kentaro Yano and Masahiro Kon, Structures on manifolds, World Scientific Publishing Company, Singpore(1984), pp. 16-17

Hani Farran, On quasi Kaehlerian manifold, Tensor, Vol. 40(1983), pp. 45-48

Shlomo Sternberg, Lectures on Symplectic Geometry, International Publishing Company, CHN(2012), pp. 127-136

Wan Yong and Donghe Pei, Integrability of distribution $D^□$ on a nearly Sasakian manifold, Acta Mathematica Academiae Paedagogicae, Vol. 25(2009), pp. 271-276.

Wan Yong and Gao Qiju, Integrability of distribution on a CR-submanifold of a quasi Kaehlerian manifold, Journal of Changsha Univ. of Electric Power(NS), Vol. 13(1998), pp. 7-15.

Chen.B.Y, CR-submanifolds of a Kaehlerian manifold, Differential Geometry, Vol. 16 (1981), pp. 305-323.

Vol. 13 No. 3 | Imp. Factor: 8.99
DOI:https://doi.org/10.5281/zenodo.15914034
Chen B.Y, Totally umbilical submanifolds of Kaehler manifolds, Archiv der Mathematik, Vol. 16(1981), pp. 83-91.