1 Notation

Variable	Meaning
ρ	Density matrix
$\|\psi\rangle$	State vector
$D(\alpha)$	Displacement operator
α	A complex number or a vector of complex numbers $\alpha = \begin{pmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_n \end{pmatrix}^T$
I	Identity matrix, note that the dimension of I will vary with context
$\int_{\mathbb{C}} d^2\alpha$	Integral over the complex plane. Can for example be done in the real and imaginary part of α, or polar coordinates.
$\chi(\alpha, \alpha^*)$,$\chi_\rho(\alpha)$	(Wigner) Characteristic function. The subscript indicates the associated operator.
$a, a^\dagger$	Ladder operators. Often vectors over n modes $a = \begin{pmatrix} a_1 & a_2 & \cdots & a_n \end{pmatrix}^T$
q, p	Quadrature operators. Often vectors over n modes.
C_α, C_a	Vector of complex numbers or operators,$C_\alpha = \begin{pmatrix} \alpha \\ \alpha^* \end{pmatrix}, C_a = \begin{pmatrix} a \\ a^\dagger \end{pmatrix}$
$\mathrm{Tr}\left\{A\right\}$	Has two possible meanings depending on context. If A is matrix of numbers, then it is the sum of the diagonal of A. If A is a matrix of operators, e.g. $A = \rho \begin{pmatrix} a & a^\dagger \\ a^\dagger & a \end{pmatrix} = \begin{pmatrix} \rho a & \rho a^\dagger \\ \rho a^\dagger & \rho a \end{pmatrix}$, then the trace is over Hilbert space, $\mathrm{Tr}\left\{A\right\} = \begin{pmatrix} \mathrm{Tr}\left\{\rho a\right\} & \mathrm{Tr}\left\{\rho a^\dagger\right\} \\ \mathrm{Tr}\left\{\rho a^\dagger\right\} & \mathrm{Tr}\left\{\rho a\right\} \end{pmatrix}$.
$\bar{C}$	Mean amplitude, or displacement, $\bar{C} = \mathrm{Tr}\left\{\rho C_a\right\}$.
Σ	Covariance matrix for the amplitudes, $\Sigma = \frac{1}{2}\mathrm{Tr}\left\{\rho\left(C_a \otimes C_a^T + C_a^T \otimes C_a\right)\right\} - \mathrm{Tr}\left\{\rho C_a^T\right\} \otimes \mathrm{Tr}\left\{\rho C_a\right\}$
Ω	The symplectic form $\Omega = \begin{pmatrix} 0 & I \\ -I & 0 \end{pmatrix}$
H_G	Hamiltonian that is at most quadratic in the ladder operators
M_+, D_+	Bogoliubov transformation and displacement associated to the unitary transformation $e^{itH_G} C_a e^{-itH_G} = M_+ C_a + D_+$
V, J	Submatrices of the M_+, i.e. $M_+ = \begin{pmatrix} V & J \\ J^* & V^* \end{pmatrix}$
z, z^*	Subvectors of D_+, i.e. $D_+ = \begin{pmatrix} z \\ z^* \end{pmatrix}$

Variable	Meaning
M_{-}, D_{-}	Bogoliubov transformation and displacement associated to the unitary transformation, $e^{-itH_G}C_a e^{itH_G} = M_{-}C_a + D_{-}$.
x, y	Vectors of real numbers.
k_{c}	Constant characterizing quadrature convention, $q = \frac{k_{\mathrm{c}}}{2}\left(a^{\dagger}+a\right), p = \frac{k_{\mathrm{c}}}{2}i\left(a^{\dagger}-a\right)$
T, T_k	Matrices that converts α, α^* to real and imaginary parts, $T = \begin{pmatrix} \frac{1}{2}I, & \frac{1}{2}I \\ -\frac{1}{2}iI, & \frac{1}{2}iI \end{pmatrix}, T_k = k_{\mathrm{c}}T$
R_Q	Vector of quadrature operators $R_Q = \begin{pmatrix} q \\ p \end{pmatrix}$
S_{+}, μ_{+}	Symplectic matrix and displacement associated with the transformation $e^{itH_G}R_Q e^{-itH_G}$
S_{-}, μ_{-}	Symplectic matrix and displacement associated with the transformation $e^{-itH_G}R_Q e^{itH_G}$
R_X, R_Y, R_Λ	Vectors of real numbers put into a bi-partite structure, $R_\Lambda = \begin{pmatrix} \Lambda_q \\ \Lambda_p \end{pmatrix}$
$\chi_\rho^{(Q)}\left(R_\Lambda\right)$	Quadrature characteristic function associated with state ρ
$\bar{R}$	Quadrature average $\bar{R} = \mathrm{Tr}\left\{\rho R_Q\right\}$
Q	Quadrature covariance matrix $Q = \frac{1}{2}\mathrm{Tr}\left\{\rho\left(R_Q \otimes R_Q^T + R_Q^T \otimes R_Q\right)\right\} - \mathrm{Tr}\left\{\rho R_Q^T\right\} \otimes \mathrm{Tr}\left\{\rho R_Q\right\}$
$W_\rho(R_X)$	Wigner function of the state ρ.
$\lvert A\rvert$	Absolute value of scalar A and determinant of matrix A
$\langle A\rangle$	Expectation value of the operator $A = \mathrm{Tr}\left\{\rho A\right\}$
$\otimes$	The Kronecker product of two arrays $A \otimes B$
A^H	Superscript H mean the conjugate transpose of A.
A^*	Elementwise complex conjugation of A.