

## Derivation

From eq(2),

$$\begin{aligned}P(\mathbf{y}) &= N(\mathbf{y}|\mathbf{m}, \Phi_b) \\&= N(\mathbf{y}|\mathbf{m}, A\Psi A^T) \\&= \mathbf{m} + A * N(\mathbf{v}|\mathbf{0}, \Psi)\end{aligned}$$

From eq(1),

$$\begin{aligned}P(\mathbf{x}|\mathbf{y}) &= N(\mathbf{x}|\mathbf{y}, \Phi_w) \\&= N(\mathbf{x}|\mathbf{m} + A\mathbf{v}, AA^T) \\&= \mathbf{m} + A * N(u|\mathbf{v}, I)\end{aligned}$$

$$\therefore \mathbf{y} = \mathbf{m} + A\mathbf{v}$$

$$\mathbf{x} = \mathbf{m} + A\mathbf{u}$$