6.2.2

$$\underline{w}_{MPDR} = \frac{\underline{S}_x^{-1}\underline{v}_m}{\underline{v}_m^{\#}\underline{S}_x^{-1}\underline{v}_m} \xrightarrow{\underline{v}_m = \underline{v}_s} \underline{w}_{MPDR} = \frac{\underline{S}_x^{-1}\underline{v}_s}{\underline{v}_s^{\#}\underline{S}_x^{-1}\underline{v}_s} \qquad (6.71)$$

$$\underline{w}_{MVDR} = \frac{\underline{S}_n^{-1}\underline{v}_s}{\underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s} \qquad (6.18, 6.19)$$

- $\underline{S}_x = \sigma_s^2 \underline{v}_s \underline{v}_s^{\#} + \underline{S}_n$
- $\underline{S}_x^{-1} = \underline{S}_n^{-1} - \underline{S}_n^{-1}(\sigma_s^2 \underline{v}_s)\left[\underline{v}_s^{\#}\underline{S}_n^{-1}(\sigma_s^2 \underline{v}_s) + 1\right]^{-1} \underline{v}_s^{\#}\underline{S}_n^{-1}$

$$= \underline{S}_n^{-1}\left[\underline{I} - \frac{\sigma_s^2}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\underline{v}_s\underline{v}_s^{\#}\underline{S}_n^{-1}\right]$$

- $\underline{S}_x^{-1}\underline{v}_s = \underline{S}_n^{-1}\left[\underline{v}_s - \frac{\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\underline{v}_s\right]$

$$= \left[\frac{1}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\right]\underline{S}_n^{-1}\underline{v}_s$$

- $\underline{v}_s^{\#}\underline{S}_x^{-1}\underline{v}_s = \left[\frac{1}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\right]\underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s$

$$\underline{w}_{MPDR} = \frac{\left[\frac{1}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\right]\underline{S}_n^{-1}\underline{v}_s}{\left[\frac{1}{1+\sigma_s^2 \underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s}\right]\underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s} = \frac{\underline{S}_n^{-1}\underline{v}_s}{\underline{v}_s^{\#}\underline{S}_n^{-1}\underline{v}_s} = \underline{w}_{MVDR}$$