The state space form of the SVF [1][2][3] consists of the following system of differential equations

$$\begin{aligned} \dot{s_1}(t) &= -\omega[2\zeta s_1(t) + s_2(t) + i(t)] \\ \dot{s_2}(t) &= \omega s_1(t) \end{aligned}$$

corresponding to a system matrix

$$A = \begin{bmatrix} -2\zeta\omega & -\omega \\ \omega & 0 \end{bmatrix}.$$

Here $2\zeta = 1/Q$ with Q the usual pole–based definition of *quality factor*, and $\omega = 2\pi f$ the angular frequency. Personally, I prefer to use the parameter ζ over Q as it makes the expression of the poles a bit easier to read. The pole equation

$$p(z) = \det(A - Is) = s^2 + 2\zeta\omega s + \omega^2 = 0$$

has two solutions

$$s_\pm = \omega(-\zeta \pm \sqrt{\zeta^2 - 1}).$$

If $\zeta < 1$ the poles are complex conjugate with complex angle only dependent on ζ, i.e. unit norm phase component $e^\theta = \zeta + i\sqrt{1-\zeta^2}$ where $\cos\theta = \zeta$.