Equation of a hyperbola:
\[
\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1, \text{ opens right and left, or east-west.}
\]
\[
\frac{(y - k)^2}{b^2} - \frac{(x - h)^2}{a^2} = 1, \text{ opens up and down, or north-south.}
\]

Let’s examine the east-west hyperbola:

Center = \((h, k)\)

Vertices = \((h + a, k)\) and \((h - a, k)\)

Slopes of asymptotes = \(\pm \frac{b}{a}\)

Equations of asymptotes \(y = k \pm \frac{b}{a}(x - h)\).

\[
\sigma^2 = \frac{CE^2 - 2AE + B}{D}
\]

\[
\sigma^2 - \frac{C}{D} \left( E^2 - 2\frac{A}{C}E \right) = \frac{B}{D}
\]
Note: Add on both sides: \( \frac{CA^2}{DC^2} \) to get

\[
\sigma^2 - \frac{C}{D} \left( E - \frac{A}{C} \right)^2 = \frac{B}{D} - \frac{CA^2}{DC^2}
\]

From page 1853: \( D = BC - A^2 \)

\[
\sigma^2 - \frac{C}{D} \left( E - \frac{A}{C} \right)^2 = \frac{1}{C}
\]
Divide both sides by \( \frac{1}{C} \) to get

\[
\frac{\sigma^2}{1/C} - \frac{(E - A/C)^2}{D/C^2} = 1
\]
Finally

\[
\frac{(\sigma - 0)^2}{1/C} - \frac{(E - A/C)^2}{D/C^2} = 1
\]

** ***

This is a hyperbola with:

Center = \( \left( 0, \frac{A}{C} \right) \)

Vertices = \( \left( \frac{1}{C}, \frac{A}{C} \right) \) and \( \left( -\frac{1}{C}, \frac{A}{C} \right) \)

Slopes of asymptotes = \( \pm \sqrt{\frac{D}{C}} \)

Equations of asymptotes \( E = \frac{A}{C} \pm \sqrt{\frac{D}{C}} \sigma \)

From (***) above we get the equation for \( E \) as a function of \( \sigma \):

\[
E = \frac{A}{C} \pm \frac{1}{C} \sqrt{D(C\sigma^2 - 1)}
\]

The equation of the efficient frontier is

\[
E = \frac{A}{C} \pm \frac{1}{C} \sqrt{D(C\sigma^2 - 1)}
\]
or

\[
E = E_{min} + \frac{1}{C} \sqrt{DC(\sigma^2 - \sigma^2_{min})}
\]

Note: \( E_{min} = \frac{A}{C} \) and \( \sigma^2_{min} = \frac{1}{C} \).