KSS TERM FOR TAU=0

$$K_{ss} = \Big\{ \underbrace{(c - \mu\sigma_i)}_{e13} r + \underbrace{(1 - r \cdot \tilde{\tau})}_{e15} - 1 \Big\} \cdot \underbrace{\frac{1}{\sigma_i^2}}_{e3}$$

I think e13+e15 shd be exactly 1:

$$e13 + e15 = cr - \mu\sigma_i r - r\tilde{\tau} + 1$$

$$= r[\underbrace{c - \mu\sigma_i - \tilde{\tau}}_{\text{shd be } 0}] + 1$$

$$= r\left[c - \mu\sigma_i - \frac{c\sigma_i - \mu}{\sigma_i}\right] + 1$$

b/c tau=0

$$= r[\underbrace{c - \mu\sigma_i - c + \mu\sigma_i}_{=0}] + 1$$

$$= 1$$:)

(1) KSS TERM

$e1 = T^2$

$e3 = s_i^2$

$e6 = s_i$

$e7 = e5/e6 = \tilde{\tau}_i$

$e8 = \Phi(\tilde{\tau}_i)$

$e9 = \phi(\tilde{\tau}_i)$

$e9/e8 = r$

$e11 = \Phi(\tilde{\tau}_i) \cdot s_i$

$e10 = (\sigma_i c - \mu) \cdot \phi(\tilde{\tau}_i)$

$= \tilde{\tau}_i s_i \cdot \phi(\tilde{\tau}_i)$

$e13 = e10/e11 = \tilde{\tau}_i r$

$e5 = \sigma_i c - \mu = \tilde{\tau}_i s_i$

$e15 = s_i^2(1 - \tilde{\tau}_i r)/e3 = (1 - \tilde{\tau}_i r)$

R's expression!

$$e13 + e15 = \tilde{\tau}_i r + 1 - \tilde{\tau}_i r = 1$$:)

TERM A:

$$(e8/e6 - e10/e3)/e11^2 = \frac{\Phi(\tilde{\tau}_i) \cdot s_i^{-1} - \dfrac{\tilde{\tau}_i s_i \cdot \phi(\tilde{\tau}_i)}{s_i^2}}{(\Phi(\tilde{\tau}_i))^2 \cdot s_i^2}$$

$$= \frac{\frac{1}{s_i}[\Phi - \tilde{\tau}_i \phi]}{s_i^2 \Phi^2}$$

$$= \frac{1}{s_i^3}\left[(\Phi)^{-1} - \tilde{\tau}_i \phi (\Phi)^{-2}\right]$$

$$= \frac{1}{s_i^3} \cdot (\Phi^{-1}) \cdot [1 - \tilde{\tau}_i r]$$ ✓

TERM B:

$$e5^2 / (e3^2 \cdot e8 \cdot e6) = \frac{\tilde{c}_i^2 \ s_i^2}{s_i^4 \cdot \Phi \cdot s_i} = \tilde{c}_i^2 \cdot (\Phi)^{-1} \ (s_i)^{-3}$$

TERM C:

$$(e13 + 2e15 - 1)/e3 = (1 + e15 - 1)/s_i^2$$

$$= (1 - \tilde{c}_i r)/s_i^2$$

Term D

$$e1 \cdot (e5 \cdot \{\text{term A} - \text{term B}\} \cdot e9 + 2 \text{ term C}) + 1$$

$$T^2 \cdot \tilde{c}_i s_i \cdot \phi \cdot \left\{ \frac{1}{s_i^3} \cdot (\Phi^{-1}) \cdot [1 - \tilde{c}_i r] - \tilde{c}_i^2 \cdot (\Phi)^{-1} \ (s_i)^{-3} \right\}$$

$$+ 2T^2 \ (1 - \tilde{c}_i r)/s_i^2 \quad + 1$$

$$= T^2 \cdot \tilde{c}_i \cdot s_i^{-2} \cdot r \cdot \{[1 - \tilde{c}_i r] - \tilde{c}_i^2\}$$

$$+ 2T^2 \ (1 - \tilde{c}_i r)/s_i^2 \quad + 1$$

$$= [T^2 s_i^{-2}] \cdot \{\tilde{c}_i r ([1 - \tilde{c}_i r] - \tilde{c}_i^2) + 2[1 - \tilde{c}_i r]\} + 1$$ ✓

$$= [T^2 s_i^{-2}] \cdot \{\tilde{c}_i r - \tilde{c}_i^2 r^2 - \tilde{c}_i^3 r + 2 - 2\tilde{c}_i r\} + 1$$

$$= -[T^2 s_i^{-2}] \cdot \{\tilde{c}_i^3 r + \tilde{c}_i^2 r^2 + \tilde{c}_i r - 2\} + 1$$ ✓

whole thing:

$$kss = (1 - \text{termD})/e3$$ ✓

$$= \left[1 + [T^2 s_i^{-2}] \cdot \{\tilde{c}_i^3 r + \tilde{c}_i^2 r^2 + \tilde{c}_i r - 2\} - 1\right] s_i^{-2}$$

$$= \boxed{T^2 s_i^{-4} \{\tilde{c}_i^3 r + \tilde{c}_i^2 r^2 + \tilde{c}_i r - 2\}}$$

FINAL SIMPLIFICATION :)

② KMS TERM

Ref:

$e2 = s_i^2$ $e8 = s_i^4$

$e3 = s_i$ $r = e9/e7$

$e5 = 6_i c - \mu = \tilde{c}_i s_i$ expectation1 $= -s_i r$

$e6 = \tilde{c}_i$

$e7 = \Phi(\tilde{c}_i)$ $e9 = \phi(\tilde{c}_i)$

Term A

$$(e7/e3 - e5 \cdot e9/e2) / (e7 \cdot e3)^2$$

$$= \frac{\Phi \cdot s_i^{-1} - \tilde{c}_i s_i \cdot \phi \cdot s_i^{-2}}{(\Phi)^2 \cdot s_i^2}$$ ✓

$= (\Phi)^{-1} s_i^{-3} - \tilde{c}_i s_i^{-3} \cdot r \cdot (\Phi)^{-1}$ ✓

$= (\Phi)^{-1} s_i^{-3} \cdot (1 - \tilde{c}_i r)$ ✓

Term B

$e5^2 / (e8 \cdot e7 \cdot e3)$

$= \dfrac{\tilde{c}_i^2 s_i^2}{s_i^4 \cdot \Phi \cdot s_i}$

$= s_i^{-3} \tilde{c}_i^2 \cdot (\Phi)^{-1}$ ✓

Term C

$(\text{term}A - \text{term}B) \cdot e9$

$= \left\{ (\Phi)^{-1} s_i^{-3} \cdot (1 - \tilde{c}_i r) - s_i^{-3} \tilde{c}_i^2 \cdot (\Phi)^{-1} \right\} \cdot \phi$

$= s_i^{-3} r \left(1 - \tilde{c}_i r - \tilde{c}_i^2\right)$ ✓

Whole thing

$- \tan \cdot (\text{term } C + 2 \cdot \text{expectation } 1 / e8)$

$= -T \cdot \left\{ s_i^{-3} r \left(1 - \tilde{c}_i r - \tilde{c}_i^2\right) - \dfrac{2 s_i r}{s_i^4} \right\}$

$= -T s_i^{-3} r \cdot \left\{ 1 - \tilde{c}_i r - \tilde{c}_i^2 - 2 \right\}$

$= -T s_i^{-3} r \cdot \left\{ -1 - \tilde{c}_i r - \tilde{c}_i^2 \right\}$ ✓

$kms = T s_i^{-3} r \cdot \left(\tilde{c}_i^2 + \tilde{c}_i r + 1 \right)$ ✓ WHOLE SIMPLIFIED EXPRESSION :)

③ KMM TERM

Ref:

$e2 = s_i^2$ $e7 = \phi(\tilde{c}_i)$ $r = e7/e8$

$e3 = s_i$ $e8 = \Phi(\tilde{c}_i)$

$e5 = \tilde{c}_i s_i$

$e6 = \tilde{c}_i$

Term A

$e5 / (e2 \cdot e8) + e7 \cdot e3 / (e8 \cdot e3)^2$

$= \dfrac{\tilde{c}_i s_i}{s_i^2 \cdot \Phi} + \dfrac{\phi \cdot s_i}{(\Phi)^2 \cdot s_i^2}$

$= s_i^{-1} \cdot (\Phi)^{-1} \cdot (\tilde{c}_i + r)$

Whole thing

$-1/e2 + \text{term}A \cdot e7/e3$

$= -s_i^{-2} + s_i^{-2} \cdot r \cdot (\tilde{c}_i + r)$

$kmm = s_i^{-2} \cdot (\tilde{c}_i r + r^2 - 1)$ ✓ WHOLE SIMPLIFIED EXPRESSION :)