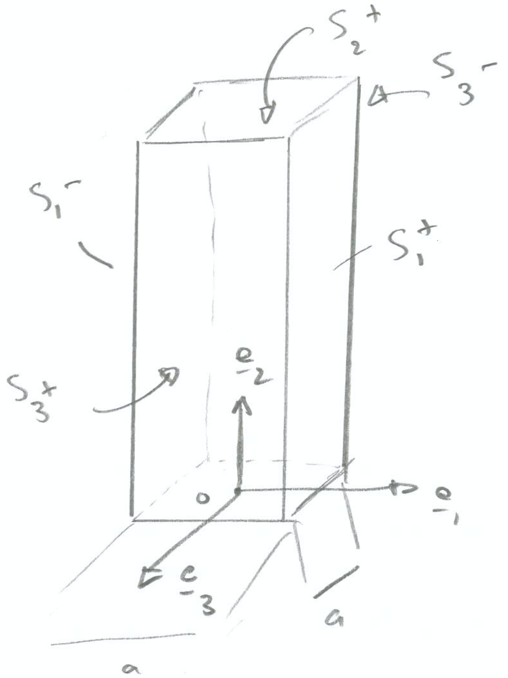
Static admissibility of a column



Question: equations for static admissibility?

▷ <u>Interior equilibrium:</u> $\underline{\underline{\sigma}}$ symmetric / $\underline{\mathrm{div}}\,\underline{\underline{\sigma}} - \rho g \underline{e}_2 = \underline{0} \quad \forall \underline{M} \in \Omega$

▷ <u>Boundary equilibrium:</u>

$$\underline{\underline{\sigma}} \cdot \underline{n} = \underline{0} \quad \forall \underline{M} \in S_1^- \cup S_1^+ \cup S_3^- \cup S_3^+ \cup S_2$$

So we get the expanded form of the equations:

$$\left.\begin{aligned}
&(1) \quad \sigma_{11,1} + \sigma_{12,2} + \sigma_{13,3} = 0 \\
&(2) \quad \sigma_{12,1} + \sigma_{22,2} + \sigma_{23,3} - \rho g = 0 \\
&(3) \quad \sigma_{13,1} + \sigma_{23,2} + \sigma_{33,3} = 0
\end{aligned}\right\} \forall \underline{M} \in \Omega$$

(4) $\sigma_{11}(a, y, z) = \sigma_{11}(-a, y, z) = \sigma_{12} = \sigma_{13} = 0 \qquad \forall y, \forall z$

(5) $\sigma_{33}(x, y, a) = \sigma_{33}(x, y, -a) = \sigma_{32} = \sigma_{31} = 0 \qquad \forall x, \forall y$

(6) $\sigma_{22}(x, H, z) = \sigma_{12}(x, H, z) = \sigma_{32}(x, H, z) = 0 \qquad \forall x, \forall z.$

Question Can $\underline{\underline{\sigma}}$ / $\sigma_{22} = -\rho g (H - x_2)$, $\sigma_{ij} = 0$ be a solution.

With that choice: (1), (3), (4), (5) are automatically ok ?.

(2) ⟹ $\sigma_{22,2} - \rho g = \rho g + \rho g = 0$ ok ? $\qquad$ (6) ⟹ $\sigma_{22}(x, H, z) = 0$ ok ? $\boxed{\text{YES}}$