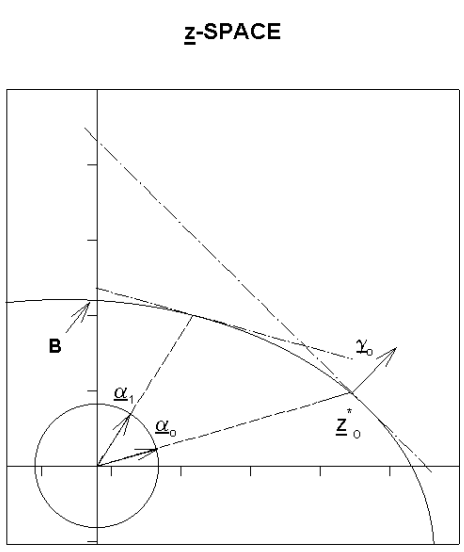
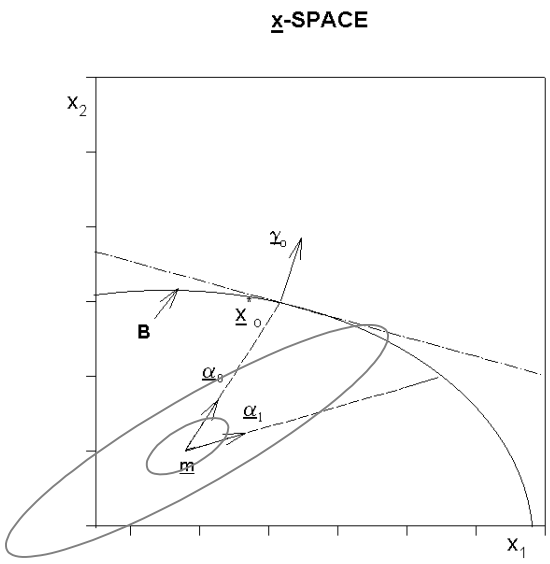
Brief Notes #9
CALCULATION OF RELIABILITY INDEX, β

$\underline{Z} \sim (\underline{0}, \underline{I})$	$\underline{X} \sim (\underline{m}, \underline{\Sigma})$
	
1. Select initial unit vector, $\underline{\alpha}_o$ 2. Find $\underline{z}^*_o = \beta_o \underline{\alpha}_o$ where $\beta_o = \min\{\beta : \beta\underline{\alpha}_o \in D_F\}$ 3. Linearize B around $\underline{z}^*_o$ Let $\underline{\gamma}_o$ be the unit external vector: $\underline{\gamma}_o = \left.\dfrac{\text{grad}\, g(\underline{z})}{\lvert \text{grad}\, g(\underline{z})\rvert}\right\rvert_{\underline{z}^*_o}$ $\propto \left[\begin{array}{c} \left.\dfrac{\partial g(\underline{z})}{\partial z_i}\right\rvert \\ \vdots \end{array}\right]_{\underline{z}^*_o}$ 4. Go back to step 2 with $\underline{\alpha}_o$ replaced with $\underline{\alpha}_1 = \underline{\gamma}_o$. Iterate until convergence in β and $\underline{z}^*$.	1. Select initial unit vector, $\underline{\alpha}_o$ 2. Find $\underline{x}^*_o = \underline{m} + \delta\underline{\alpha}_o \in B$ and calculate β_o as: $\beta_o = \delta\left(\underline{\alpha}_o^T \underline{\Sigma}^{-1} \underline{\alpha}_o\right)^{\frac{1}{2}}$ 3. Linearize B at $\underline{x}^*_o$. (Calculate $\underline{\gamma}_o$ as in $\underline{z}$ space). 4. The next search direction $\underline{\alpha}_1$ is that of the β point according to the linearized boundary. From analytical geometry, $\underline{\alpha}_1 \propto \underline{\Sigma}\,\underline{\gamma}_o$. 5. Go back to Step 2 until convergence.