Literature Review

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The report used by Wuethrich used the following formulas defined in a paper by Bogar to define the geometry of the diffuser.

$$\tilde{h}(\tilde{x}) = \frac{\alpha * \cosh(\zeta)}{(\alpha - 1) + \cosh(\zeta)} \tag{1}$$

$$\zeta = \frac{C_1(\tilde{x}/\tilde{l})(1 + C_2(\tilde{x}/\tilde{l}))^{C_3}}{(1 - \tilde{x}/\tilde{l})^{C_4}} \tag{2}$$

The **blockMeshDict** used in the paper used 10 blocks and had 81 x 51 volumes total (see Figure 1). The mesh was never refined due to time constraints. The study found that **sonicFoam** was able to capture the location of the of the shock well in the weak shock case, it did not capture flow separation well and low speed boundary layers were not fully developed. The solver also estimated the minimum of the shock to be too high. **sonicFoam** systematically underestimated the velocities. In the strong shock case was predicted much better by **sonicFoam** but it predicts it a little too far downstream. **sonicFoam** would also over predict the velocities.

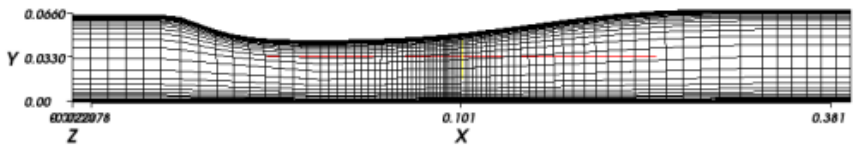

Figure 1: Mesh used in the study.