Project #1: *A priori* study

Part II: SGS modeling

After performing partI, perform the following steps for two different SGS models (each with the both filter widths):

1. Compute the modelled SGS stress, $\tau_{ij}^{R,M}$, and compare the profiles of exact, $\langle \tau_{12}^{R} \rangle$, and modelled, $\langle \tau_{12}^{R,M} \rangle$, mean SGS stress along x_2. Also, compare the correlation coefficient of them along x_2 (all models on a single plot). Which model is more accurate?

2. Draw the contour plots of ν_t/ν. What does this data indicate?

3. Compute the field of exact and modelled SGS energy transfer rates, $P_r = -\tau_{ij}^r \bar{S}_{ij}$ and $P_r^M = -\tau_{ij}^{r,M} \bar{S}_{ij}$. Plot the contours of both rates. Is there any back scatter in the Filtered DNS data (exact field)? Can any of the model predict the back scatter (see modeled filed)?

4. Compare the profiles of the mean rate of SGS energy transfer rates, $\langle P_r \rangle$ and $\langle P_r^M \rangle$, along x_2.

5. Plot the profiles of $\langle \varepsilon_f \rangle / \langle \varepsilon_r \rangle$ and $\langle \varepsilon_r \rangle / \langle P_r \rangle$ along x_2. What does it mean?