Využijme předchozí case k rozšíření o další úkoly:

- 2.1 Stavte Reynoldsovo číslo
- 2.2 Na základě výpočetní sítě stanovte časový krok dle CFL podmínky
- 2.3 Vykreslete kontury tlaku
- 2.4 Vykreslete rychlostní profil pro U_x

Řešení

cp -r \$FOAM_TUTORIALS/incompressible/icoFoam/cavity/cavity \$FOAM_RUN/cavity2 cd \$FOAM_RUN/cavity2 blockMesh | paraFoam &

Pro výpočet Re:

U = 1 m/s, dy = 0.1 m, $\nu = ? \text{ m}^2.\text{s}^{-1}$

Kinematickou vazkost nalezneme zde:

gedit constant/ transportProperties

$$\nu = 0.01 \text{ m}^2 \text{.s}^{-1}, \text{Re} = \frac{\text{dyU}}{\nu} = 10$$

dt = ?

V tomto panelu níže vybereme Interactive Select Cell Zone a označíme element s poměrem největší rychlost ku nejmenší velikost.



Zobrazení konkrétního elementu provedeme přes Extract Selection (pro rychlejší orientaci lze použít ctrl+space jako vyhledávač v ParaView).

Na informační kartě odečteme velikost elementu ve směru proudění a počítáme

$$\Delta x = 0.005~{\rm m},~Co = 1, U = 1~{\rm m.s^{-1}},~Co = \frac{\Delta t U}{\Delta x} \Rightarrow \Delta t = \frac{Co\Delta x}{U} = 0.005~{\rm s}$$



Kontury tlaku vykreslíme pomocí Stream Tracers v rovině řezu (Slice).



Jak z9skat složku rychlosti U_x ? Zadejme v terminálu následující příkaz. Tím v každém jednotlivém časovém adresáři, který máme vytvořen. Počínaje 0 a konče 0.5, rozložíme vektor U na tři složky.

postProcess -func "components(U)"

Nalevo v panelu necháme načíst Volume Field Ux.



Nyní provedeme řez (Slice) kolmý na osu Z (Z-normal) a vytvoříme graf přes Filters-Alphabetical-Plot Over Line. Umístění inic. a fin. bodu budiž následující Point1=[0.05; 0.1; 0.005] a Point2=[0.05; 0; 0.005].

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