**Chapter 4**

**Validation**

**4.1 Turbulent channel test case**

A classical turbulent benchmark case is the Kim & Moser configuration originally presented in a landmark paper [1] published in POF. Results from this paper provide a high-fidelity statistical database for momentum driven turbulent channel flows at a range of moderate Reynolds number. Close comparison to the results provides a valuable validation test case for our turbulence model.

Turbulent flow terminology

Law of the wall which states that in the viscous sublayer region (y+ < 5)

And in the log-law region (y+ > 30)

where K = 0.41 is the Von Karman constant and B = 5.2 is a turbulent constant.

**4.1. Kim and Moser**

* **Definition of viscous-wall units**
* **LES resolution requirements (wall-resolved)**
* **Models used: lagrangian averaging, dynamic eddy viscosity, eddy diffusivity**
* **Results**

**4.2. Nicoud**

* **Definition of temperature viscous-wall units, bulk Reynolds number**
* **Description of test case**
* **Models used: lagrangian averaging, dynamic eddy viscosity, eddy diffusivity**
* **Results**

**4.3. Tsuji and Nagano**

* **Description of test case**
* **Models used:**
* **Results**