

Contents

1	Introduction	1
2	Modeling Equations	4
2.1	Continuity Equation	4
2.2	Momentum Equation	6
2.2.1	Viscosity coefficients η_x^i and η_y^i	6
2.2.2	Viscous flux limiters	8
2.2.3	Remarks	9
2.3	Electron Energy Equation	10
2.3.1	Electron heat conductivity coefficients κ_x^e and κ_y^e	11
2.3.2	Electron-ion energy equilibration term	12
2.3.3	Remarks	12
2.4	Ion Energy Equation	13
2.4.1	Ion heat conductivity coefficients κ_x^i and κ_y^i	14
2.4.2	The viscous energy terms	15
2.4.3	Remarks	15
3	Benchmark Test of Modeling Equations	17
3.1	Geometry	17
3.2	Boundary Conditions	18
3.3	Results and Discussion	20
4	Conclusion	36
A	Derivation of the Internal Energy Equation	37
B	The Discretization Error	40
C	Input Parameters	42
C.1	B2 Input Parameters	42
C.2	B2.5 Input Parameters	43
D	Odd-even decoupling Oscillations in B2.5	45
D.1	Description of the test case	45
D.2	Results and Discussion	46
E	B2 Bug Fixes	50
E.1	Interpolation of radial viscous momentum flux	50
E.2	Correction to viscous energy terms	51