

# Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	The equation of radiative transfer . . . . .	4
1.1.1	Equation of transfer in different media and geometries:	4
1.2	The Spherical Harmonic Methods. (SHM) . . . . .	11
1.2.1	The necessity of modification . . . . .	17
1.2.2	Double Interval Spherical Harmonic Method . . . . .	19
1.2.3	Modifications of Double Interval SHM. . . . .	21
1.2.4	Work done so far by the use of SHM in solving Ra- diative Transfer Problems . . . . .	23
1.3	Coherent Scattering . . . . .	41
1.3.1	Development of the equation . . . . .	42
1.3.2	Work done so far in solving Coherent Scattering Problems . . . . .	44
<b>2</b>	<b>Solution of the equation of transfer for coherent isotropic scattering by double interval spherical harmonic method.</b>	<b>47</b>
2.1	The equation and boundary conditions : . . . . .	47
2.1.1	Solutions . . . . .	53
2.1.2	First Approximation. . . . .	55

2.1.3	Determination of source function and law of darkening	62
2.1.4	Second approximation . . . . .	64
<b>3</b>	<b>Solution of the equation of transfer for coherent anisotropic scattering by double interval spherical harmonic method.</b>	<b>73</b>
3.1	The equation and boundary conditions : . . . . .	73
3.2	Planetary phase function . . . . .	75
3.2.1	Solutions: . . . . .	82
3.2.2	First Approximation . . . . .	84
3.2.3	Determination of source function and law of darkening	93
3.2.4	Second approximation . . . . .	96
3.3	Rayleigh phase function . . . . .	102
3.3.1	Solutions . . . . .	109
3.3.2	First Approximation . . . . .	112
3.3.3	Determination of source function and law of darkening	116
3.3.4	Second approximation . . . . .	119
3.4	Pomraning phase function . . . . .	125
3.4.1	Solutions . . . . .	132
3.4.2	First Approximation . . . . .	135
3.4.3	Determination of source function and law of darkening	140
3.4.4	Second approximation . . . . .	143
3.5	Generalized phase function . . . . .	151
3.5.1	First approximate solution . . . . .	157
3.5.2	Planetary phase function . . . . .	158
3.5.3	Rayleigh phase function . . . . .	159

3.5.4	Pomraning phase function . . . . .	160
<b>4</b>	<b>Solution of transfer equation with Pomraning phase function by double interval spherical harmonic method.</b>	<b>162</b>
4.1	The equation and boundary conditions : . . . . .	162
4.2	First Approximate Solution in case of scattering with Pomraning Phase Function . . . . .	166
<b>5</b>	<b>Approximate H-function for anisotropic scattering: Pomraning phase function.</b>	<b>171</b>
5.1	Introduction . . . . .	171
5.2	Formation of the problem . . . . .	171
5.3	case I: . . . . .	173
5.4	Case II: . . . . .	179
5.5	Case III: . . . . .	181
5.6	case IV: . . . . .	183
5.7	Case V: . . . . .	185
5.8	Case VI: . . . . .	188
	Bibliography	