

# Contents

<b>1</b>	<b>Introduction</b>	<b>9</b>
<b>2</b>	<b>Indefinite Krein-Feller Differential Operators</b>	<b>15</b>
2.1	The Krein-Feller Differential Expression . . . . .	16
2.2	The Generalized Differential Equation $-D_m D_x f = \lambda f$ . . . . .	23
2.3	Regular Problems . . . . .	25
2.4	Singular Problems in the $m$ -Limit Point Case and with $0 \in \rho(A)$ . . . . .	32
2.5	The Dirichlet Form . . . . .	39
<b>3</b>	<b>Regularity of the Critical Point Infinity</b>	<b>53</b>
3.1	Simple Regularity Criteria . . . . .	54
3.2	The Generalized One-Hand Beals Condition . . . . .	55
3.3	Applications of the Beals Condition . . . . .	62
3.4	Eigenvalue Problems with Interface Conditions . . . . .	66
3.5	A Counterexample . . . . .	70
<b>4</b>	<b>Spectral Functions and Fourier Transformations</b>	<b>73</b>
4.1	The Space Triple $K_+ \subset K \subset K_-$ . . . . .	74
4.2	Representations of the Weyl Coefficient, Spectral Functions . . . . .	79
4.3	The Fourier Transformation . . . . .	84
4.4	The Space Triple $L_{\sigma_+}^2 \subset L_\sigma^2 \subset L_{\sigma_-}^2$ . . . . .	91
4.5	Isomorphism between the Hilbert Spaces $(K_\pm, \{\dots\}_\pm)$ and $(L_{\sigma_\pm}^2, (\dots)_{\sigma_\pm})$ .	95
4.6	Isomorphism between the Krein Spaces $(K, [\cdot, \cdot])$ and $(L_\sigma^2, [\cdot, \cdot]_\sigma)$ . . . . .	101
4.7	Another Regularity Criterion . . . . .	108

<b>A Lebesgue-Stieltjes Integrals</b>	<b>111</b>
<b>B Quasi <math>J</math>-nonnegative Operators in Krein Spaces</b>	<b>117</b>
<b>C The Krein Space <math>(L^2_\mu, [\cdot, \cdot]_\mu)</math></b>	<b>123</b>
<b>D The Representation Theorem of Kato for Forms in Krein Spaces</b>	<b>125</b>
<b>Bibliography</b>	<b>127</b>
<b>Notation Index</b>	<b>131</b>
<b>Index</b>	<b>132</b>