工程數學二 B 班期末考 Jan.14,2004 (J.T. Chen)

1. Please fill in the following table (20%)

	$p(x)$	$q(x)$	$x=0$ Regular? Irregularly singular? Regularly singular?	Indicial equation?	r_1 r_2
$(1-x^2)y''-2xy'+2y=0$					
$y''-\frac{2}{(1-x)^2}y=0$					
$4xy''+2y'+y=0$					
$x^2y''+xy'+x^2y=0$					

where $y''+p(x)y'+q(x)y=0$

2. Solve the series solution of $(1-x^2)y''-2xy'+6y=0$. (20%)

3. Solve the indicial equation and series solution of $x^2y''-4xy'-6y=0$ using $y(x)=\sum_{n=0}^{\infty}c_nx^{n+r}$. (20%)

4. Find the indicial equation of $x(x-1)y''+3xy'+y=0$. (10%)
Find the series solution for the case of smaller r_1. (10%)

5. Find the indicial equation of $(1-x^2)y''-xy'+y=0$. (10%)
Find the series solution using $\sum_{n=0}^{\infty}c_nx^{n+r}$ for the case of larger r_2. (10%)

6. Find the indicial equation of $(1-x^2)y''-xy'+4y=0$. (10%)
Find the series solution using $\sum_{n=0}^{\infty}c_nx^{n+r}$ for the case of smaller r_1. (10%)

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