

G SOLDO

- MULTIPLY BY WEIGHT FUNCTION TO GET AN ADDITIONAL DEGREE OF FREEDOM
- REWRITE TO INCLUDE SL TERMS
- CONDITION FOR REMOVING OTHER TERMS
 - IDENTIFY FORM OF DE
 - SEPARATE VARIABLES
 - INTEGRATE UP, REMEMBERING:
 - INTEGRATION HERE ~~RE~~INCLUDES AN ADDITIVE CONSTANT
 - UNSPECIFIED LOWER LIMIT DEALS WITH THIS, SPECIFY HIGHER INTEGRATION LIMIT
- ↓ OBTAIN GENERAL RESULT
- APPLY GENERAL RESULT TO OBTAIN WEIGHT FUNCTION
- ↓ OBTAIN:

SLO ~~SA IF-CONDITION~~

SA IF-CONDITION

- USING INTEGRAL & SL FORM
- REMOVE OUTER DERIVATIVE (INT BY PARTS)
 - REMOVE INNER DERIVATIVE (INT BY PARTS) (SENDS UP WITHIN OUTER DERIVATIVE AGAIN)
- \oint INTEGRAL WHERE u & v EXCHANGED PLUS BOUNDARY TERM
- ↓ REWRITE INTEGRAL, ZERO BOUNDARY TERM

IF SA WRT WEIGHT $w: \psi$ ARE REAL.

When ψ is real:
start from one, work on that (ie the cc, ~~the cc~~ multiply, subtract)

- WRITE EIGENVALUE EQ
- TAKE CC
- USING S.A. NESS, EXPRESS 0 AS RESULT OF A SUBTRACTION
- SIMPLIFY, OBTAIN RESULT

- EIGENFUNCTIONS ARE ORTHOGONAL

- WRITE ~~(#w)~~ EIGENVALUE EQS.
- MULTIPLY EACH BY A SUITABLE FUNCTION THAT YOU'LL BE EXPRESS ZERO AS A SUBTRACTION OF TWO INNER PRODUCTS
- ↓ SIMPLIFY, OBTAIN RESULT.

~~SA IF-CONDITION~~ EIGENFUNCTION EXPANSIONS

- $\{ \psi_n, n=1, 2, \dots \}$: EIGENFUNCTIONS OF SA OPERATOR
- CLAIM: WRITE EXPANSION
- ↓ PROVE THAT THE COEFFICIENTS HAVE TO BE ~~GIVEN~~ GIVEN BY [WHAT]

COMPLETENESS RELATION OF ~~EIGENVALUE~~ EIGENFUNCTION EXPANSIONS.

- WRITE f AS SUM OF EIGENFUNCTIONS, INTEGRAL FORM OF DOT PRODUCT
- BRING WHAT YOU CAN TO WITHIN INTEGRAL, USE ~~PROPERTY OF THE~~ SUBSTITUTION PROP OF DELTA FUNCTION TO OBTAIN RESULT

DE SOL USING GF

$$\cancel{y(x)} \quad \int y(x) = f(x)$$

- MAKE ASSUMPTIONS
- WRITE FORMAL SOLUTION ITO GF
(THINK ABOUT WHAT HAPPENS IF $f(x)$ IS APPLIED TO A FORMAL SOL IN INT. FORM, RECALL SUBSTIT PROP OF δ FUNCTIONS)
- GF IS SOL TO WHAT
- HAVE TO SATISFY WHAT
- WRITE GF EXPLICITLY AS SUM OF EIGENFUNCTIONS
- ~~NEED~~ PROVE THAT THIS IS A SOL TO THE EQ IT IS RECD TO BE A SOL.
 - MOVE OPERATOR
 - USE COMPLETENESS RELATION
 - USE COMMUTER FOR δ FUNCTION

DE SOL USING EIGENFUNCTION EXP.

- PUT DO INTO SL FORM.
- DETERMINE EIGENFUNCTIONS & EIGENVALUES λx
~~TRY @ Q. 2~~
~~APPLY BCS TO OBTAIN CONSTANTS~~
 - APPLY BCS TO OBTAIN CONSTANTS
 - NORMALIZE
- WRITE SOL AS \sum OF EIGENFUNCTIONS
- NEED COEFFS SO MULTIPLY BY y_n , FORM DOT PRODUCT, REARRANGE, OBTAIN RESULT.