**LAPLACE TRANSFORMATION**

Note:

Evaluate:

Solution

Note:

2)

3)

4)

Example: Evaluate

Solution

Let S=2

9(2) – 8 = A(2 – 2) + B(2)

18 – 8 = 2B

10 = 2B

9(0) – 8 = A(0 – 2) + B(0)

-8 = A(-2)

=4+

Example: Evaluate f(s) =

Solution

Let s=3

9-45+41= C(5)

5=5C

C=1

Let S = –2

(–2)2 – 15 (–2) + 41= A (–2 –3)2

4+30+41 = A(–5)2

75 = 25A

A=75/25

A=3

A(s2 – 6s+9) +B (s2 – s – 6) + c (s+2) = s2 – 15s + 41

As2 + Bs2 = s2

A + B = 1

3 + B = 1

B = 1 – 3

B = –2

=3e–2t – 2e3t + te3t

Example:

Evaluate

Solution

4s2 – 5s + 6=A(s2+4)+(Bs+c)(s+1)

Put s = –1

4(–1)2 – 5 (–1) + 6 = A[(–)2+4] + (B(–1) + c)( –1+1)

4 + 5 + 6 = A (5)

15 = 5A

A=15/5

A=3

S2 – 5s + 6 = As2 + 4A + Bs2 + Bs + cs + c

Equating,

4s2 = As2 + Bs2

4 = A + B

A=3

4 = 3 + B

B=1

–5s = Bs + cs

–5 = 1 + c

C = –5 –1

C= –6

= 3e–t + cos2t -

= 3e–t + cos2t – 3sin2t

**LAPLACE TRANSFORMATION**

Example

Evaluate

Solution

22s+16=A(s-2)(s-3)+B(s+1)(s-3)+C(s+1)(s-2)

Put S=2

22(2)+16=B(2+1)(2+3)

44+16=B(3)(5)

60=15B

B=4

Put S = –3

22(–3) + 16 = C(–3+1)(–3 –2)

–66 + 16 = C(–2)(–5)

–50 = 10C

C = –5

Put S = –1

22(–1)+16 = A(–1 –2)(–2+3)

–22+16=A(–3)(1)

–6=–3A

A=2

Example:

Evaluate

Solution

Put s=2

22 – 11(2)+6=c(2+1)

4 – 22 + 6 = c(3)

–12 = 3C

C= –12/3

C= –4

Put S = –1

(–1)2 – 11(–1)+6=A(–1–2)2+B(–1+1)( –1–2)+c(–1+1)

1+11+6=A(–3)2

18=9A

A=18/9

A=2

S2 = AS2 +BS2

A+B=1

Put A=2

2+B=1

B= –1

=2e–t – e2t – 4te2t

Example:

Evaluate

Solution

Put s=4

4(4)2 – 17(4) – 24 = c(4)(4+3)

64 – 68 – 24 = c(4)(7)

–28 = c(28)

C= –1

Put s = –3

4(–3)2 – 17(–3) – 24 = b(–3)( –3 –4)

4(9)+51 – 24=B(–3)( –7)

36+51–24=B(21)

63=21B

B=3

Put s=0

4(0)2 – 17(0) – 24 = A (0+3)(0 – 4)

–24 = A(3) (–4)

–24 = –12A

A=2

Example

Evaluate

Solution

Put s=3

5(3)2 – 4(3) – 7 = A(32+4)

45 – 12 – 7 = A (9+4)

26 = A(13)

A = 2

A+B=5

2+B=5

B=5 – 2

B=3

–4s = –3Bs + Cs

–4 = –3(3) +c

–4+9=c

C=5

=2e3t +3cos 2t + 10sin 2t