LECCION 4 - EJERCICIO 7 (15.7) v.2005

INICIO

```
Off[General::"spell1"]
Off[General::"spell"]
```

DEFINICION MODULO INTEGRAL SOBRE TRIANGULO LADOS RECTOS

```
IntegrateOverTriangle[expr_, tcoord_, A_, max_] := Module[{p, i, j, k, z1, z2, z3, c, s = 0},
   p = Expand[expr]; {z1, z2, z3} = tcoord; For[i = 0, i ≤ max, i++, For[j = 0, j ≤ max, j++,
     For[k = 0, k ≤ max, k++, c = Coefficient[Coefficient[Coefficient[p, z1, i], z2, j], z3, k];
      s += 2 * c * (i! * j! * k!) / ((i + j + k + 2)!);]]]; Return[Simplify[A * s]]];
```

EJEMPLO EXPRESION POLINOMICA

```
p = 16 + 5 * b * ξ2^2 + ξ1^3 + ξ2 * ξ3 * (ξ2 + ξ3);
```

ANALISIS CONTENIDO MODULO

1

```
Expand[p]
```

$$16 + \xi 1^3 + 5\, b\, \xi 2^2 + \xi 2^2\, \xi 3 + \xi 2\, \xi 3^2$$

2

```
? Coefficient
```

Coefficient[*expr*, *form*] gives the coefficient of *form* in the polynomial *expr*.
Coefficient[*expr*, *form*, *n*] gives the coefficient of *form*^*n* in *expr*. ≫

```
Coefficient[p, ξ1]
```

0

```
Coefficient[p, ξ1, 3]
```

1

3 - UTILIZA LA INTEGRAL-T

```
IntT = 1/(2A) ∫_Ω(e) ζ1^i ζ2^j ζ3^k dΩ^(e) = i! j! k! / (i + j + k + 2)!,  i ≥ 0, j ≥ 0, k ≥ 0 ;
```

```
Show[IntT, ImageSize → 300]
```

$$\frac{1}{2A}\int_{\Omega^{(e)}} \zeta_1^i\, \zeta_2^j\, \zeta_3^k\, d\Omega^{(e)} = \frac{i!\, j!\, k!}{(i+j+k+2)!}, \quad i \geq 0,\ j \geq 0,\ k \geq 0$$

APLICACION DEL MODULO

```
p
```

$$16 + \xi 1^3 + 5\,b\,\xi 2^2 + \xi 2\,\xi 3\,(\xi 2 + \xi 3)$$

```
int = IntegrateOverTriangle[p, {ξ1, ξ2, ξ3}, A, 3]
```

$$\frac{1}{6} A\,(97 + 5\,b)$$