* COSTO *

def (costo) il costo del calcolo del valore di una funzione è il numero di op elem effettuati.

Oss: op-elem = $\{ \oplus, \ominus, \otimes, \oslash, \leq, =, \text{SQRT} \}$

Oss:
- costo della somma di due numeri interi di n cifre $\equiv n$
- $\xi_1 = 2^{b_1} 0,1$, $\xi_2 = 2^{b_2} 0,1$

$\Rightarrow \xi_1 \otimes \xi_2 = 2^{b_1 + b_2} 0,01 = \ldots$

occorre SOMMARE gli espon.

$\Rightarrow$ **costo $\otimes$ dip dagli operandi**

- se ESPONENTI LIMITATI allora

costo op elem indip dagli operandi

- $M = F(\beta, m, b_{min}, b_{max}) \ldots$

number_properties

determine floating-point parameters

Calling Sequence

```
pr = number_properties(prop)
```

Arguments

prop
: string

pr
: real or boolean scalar

Description

This function may be used to get the characteristic numbers/properties of the floating point set denoted here by F(b,p,emin,emax) (usually the 64 bits float numbers set prescribe by IEEE 754). Numbers of F are of the form:

```
sign * m * b^e
```

e is the exponent and m the mantissa:

```
m = d_1 b^(-1) + d_2 b^(-2) + .... + d_p b^(-p)
```

d_i the digits are in [0, b-1] and e in [emin, emax], the number is said "normalised" if d_1 ~= 0. The following may be gotten:

prop = "radix"
: then pr is the radix b of the set F $= 2$

prop = "digits"
: then pr is the number of digits p $= 53$

prop = "huge"
: then pr is the max positive float of F $\simeq 1{,}79 \cdot 10^{308}$

prop = "tiny"
: then pr is the min positive normalised float of F $\simeq 2{,}22 \cdot 10^{-308}$

prop = "eps"
: then pr is the epsilon machine (generally (b^(1-p))/2) which is the relative max error between a real x (such than |x| in [tiny, huge]) and fl(x), its floating point approximation in F

prop = "minexp"
: then pr is emin $= -1021$

prop = "maxexp"
: then pr is emax $= 1024$

Es: $x, y \in \mathbb{R}^n$; $x^T y$ costa ... n prodotti + $+ (n-1)$ somme ... costo (asintotico) $\sim 2n$.

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(1) Costo EGPP : $\sim \frac{2}{3} n^3$

(2) Costo SI, SA : $\sim n^2$

(3) Costo calcolo di fatt QR : $\sim \frac{4}{3} n^3$

$\Rightarrow$ costo soluz sist (~~fatt~~ + SA + SI) :

$\sim \frac{2}{3} n^3$ (EGPP) / $\sim \frac{4}{3} n^3$ (QR)