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" FILE M5 "

"PROGRAM : HO3 energy value"

"This file is the fifth one of the suite working out calculations reported in :
  Comments on MECHANICS and THERMODYNAMICS of the BERNOULLI OSCILLATORS Parts I
  and II, (Google search : FEDOA Comments on), by G. Mastrocinque - Department
  of Physics - Engineering Faculty - University of Naples Federico II"

"Warning : Before this one, please be sure you have run the programs HO3 FS wave
  equation solve, HO3 SS wave equation solve, HO3 flow and mass functions
  and HO3 velocity fields in the same library to pick up input data"

" CALCULATION OF THE ENERGY VALUE  $E_n$  "

"evaluate the energy eigenvalue (integrate eq. (88)) :"
4 NIntegrate[ $\sqrt{\frac{\text{meff}[\xi]}{2 m} \left( \left( \frac{9}{2} - f[\xi] \right) \sqrt{f[\xi]} \right)}$ , { $\xi$ , 0,  $\xi_{\text{fin}}[n]$ },
  AccuracyGoal  $\rightarrow \infty$ , MinRecursion  $\rightarrow 4$ , MaxRecursion  $\rightarrow 1000000$ ]
4 NIntegrate[ $\sqrt{\frac{\text{meff}[\xi]}{2 m} \left( (4 - f[\xi]) \text{Re}[\sqrt{f[\xi] - 1}] \right)}$ , { $\xi$ , 0,  $\xi_{\text{fin}}[n]$ },
  AccuracyGoal  $\rightarrow \infty$ , MinRecursion  $\rightarrow 4$ , MaxRecursion  $\rightarrow 1000000$ ]
"result : the calculated energy  $e_n$  (eq. (89)) is == "
 $\frac{2 h \nu c}{3 \pi c n}$  (%% - %)
"relative error compared to expected value :"
 $\eta = \frac{\% - e_n}{e_n}$ 
" END OF CALCULATIONS "

```

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FS wave equation solve, HO3 SS wave equation solve, HO3 flow and mass
functions and HO3 velocity fields in the same library to pick up input data
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CALCULATION OF THE ENERGY VALUE E_n

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evaluate the energy eigenvalue (integrate eq. (88)) :
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```
12.248
```

```
-1.06621
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```
result : the calculated energy  $e_n$  (eq. (89)) is ==
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```
2.50096 h v c
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relative error compared to expected value :
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0.000384364
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END OF CALCULATIONS