

**Reciprocal values of the fine-structure constant α^{-1}
CODATA 1973-2018:**

Analysis for 1973. $\alpha^{-1} = 137.03612 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_9 - \kappa_{10} - \kappa_{11} - \kappa_{13} - \kappa_{15} - \kappa_{17} + \kappa_{19} - \kappa_{20} + \kappa_{21} + \kappa_{24} + \kappa_{25} + \kappa_{26} + \kappa_{28} + \kappa_{29}$.

Analysis for 1986. $\alpha^{-1} = 137.0359895 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{12} - \kappa_{13} + \kappa_{16} + \kappa_{17} + \kappa_{18} - \kappa_{19} - \kappa_{20} - \kappa_{21} - \kappa_{23} - \kappa_{24} - \kappa_{25} + \kappa_{26} + \kappa_{27} - \kappa_{28} + \kappa_{29}$.

Analysis for 1998. $\alpha^{-1} = 137.03599976 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} + \kappa_{14} - \kappa_{16} - \kappa_{17} - \kappa_{18} - \kappa_{19} - \kappa_{20} + \kappa_{24} + \kappa_{28} + \kappa_{29}$.

Analysis for 2002. $\alpha^{-1} = 137.03599911 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} - \kappa_{13} + \kappa_{14} - \kappa_{15} + \kappa_{16} - \kappa_{17} - \kappa_{18} + \kappa_{20} - \kappa_{21} - \kappa_{22} + \kappa_{24} - \kappa_{26} + \kappa_{27} - \kappa_{28} - \kappa_{29}$.

Analysis for 2006. $\alpha^{-1} = 137.035999679 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} + \kappa_{15} + \kappa_{16} + \kappa_{19} - \kappa_{20} - \kappa_{24} + \kappa_{25} + \kappa_{26} - \kappa_{28}$.

Analysis for 2010. $\alpha^{-1} = 137.035999074 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} - \kappa_{13} + \kappa_{14} - \kappa_{15} - \kappa_{16} + \kappa_{20} + \kappa_{22} - \kappa_{23} + \kappa_{24} - \kappa_{25} + \kappa_{27} + \kappa_{28}$.

Analysis for 2014. $\alpha^{-1} = 137.035999139 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} - \kappa_{13} + \kappa_{14} - \kappa_{16} - \kappa_{17} + \kappa_{18} + \kappa_{19} - \kappa_{21} - \kappa_{23} - \kappa_{24} - \kappa_{25} - \kappa_{26} + \kappa_{27} + \kappa_{28} + \kappa_{29}$.

Analysis for 2018. $\alpha^{-1} = 137.035999084 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} - \kappa_{13} + \kappa_{14} - \kappa_{15} - \kappa_{16} + \kappa_{17} + \kappa_{18} - \kappa_{23} - \kappa_{24} - \kappa_{25} - \kappa_{26} + \kappa_{28}$.

Analysis for 2018 - extreme precision: $\delta \sim 10^{-294}$. $\alpha^{-1} = 137.035999084 \approx 137 + 2\kappa_4 + \kappa_5 + \kappa_6 + \kappa_7 - \kappa_8 - \kappa_9 + \kappa_{10} - \kappa_{11} - \kappa_{13} + \kappa_{14} - \kappa_{15} - \kappa_{16} + \kappa_{17} + \kappa_{18} - \kappa_{23} - \kappa_{24} - \kappa_{25} - \kappa_{26} + \kappa_{28} + \kappa_{31} + \kappa_{32} + \kappa_{33} + \kappa_{35} - \kappa_{36} - \kappa_{41} + \kappa_{42} - \kappa_{43} + \kappa_{46} + \kappa_{47} + \kappa_{49} - \kappa_{53} + \kappa_{55} - \kappa_{56} + \kappa_{60} - \kappa_{63} - \kappa_{64} - \kappa_{65} + \kappa_{66} + \kappa_{67} + \kappa_{70} + \kappa_{71} - \kappa_{72} + \kappa_{74} - \kappa_{75} - \kappa_{77} - \kappa_{78} + \kappa_{79} + \kappa_{80} - \kappa_{82} + \kappa_{83} - \kappa_{85} + \kappa_{87} + \kappa_{88} - \kappa_{89} + \kappa_{90} + \kappa_{91} - \kappa_{93} + \kappa_{96} - \kappa_{98} - \kappa_{101} + \kappa_{102} - \kappa_{104} + \kappa_{105} + \kappa_{106} + \kappa_{108} - \kappa_{109} + \kappa_{110} + \kappa_{112} + \kappa_{113} - \kappa_{114} + \kappa_{115} - \kappa_{116} - \kappa_{117} + \kappa_{118} + \kappa_{120} + \kappa_{121} + \kappa_{128} - \kappa_{130} + \kappa_{132} + \kappa_{133} - \kappa_{136} + \kappa_{137} - \kappa_{138} + \kappa_{142} + \kappa_{143} - \kappa_{145} + \kappa_{146} - \kappa_{147} - \kappa_{148} - \kappa_{149} + \kappa_{150} + \kappa_{153} - \kappa_{154} + \kappa_{155} - \kappa_{156} - \kappa_{157} + \kappa_{160} + \kappa_{161} + \kappa_{163} + \kappa_{167} + \kappa_{170} + \kappa_{171} - \kappa_{174} + \kappa_{175} - \kappa_{178} - \kappa_{180} - \kappa_{181} + \kappa_{182} + \kappa_{183} - \kappa_{184} + \kappa_{185} - \kappa_{187} - \kappa_{188} - \kappa_{189} + \kappa_{190} - \kappa_{193} + \kappa_{194} + \kappa_{195} + \kappa_{199} + \kappa_{201} + \kappa_{202} - \kappa_{203} + \kappa_{205} + \kappa_{206} + \kappa_{207} - \kappa_{208} + \kappa_{210} + \kappa_{211} - \kappa_{214} - \kappa_{217} - \kappa_{219} - \kappa_{222} - \kappa_{223} - \kappa_{225} - \kappa_{227} + \kappa_{229} - \kappa_{231} - \kappa_{232} - \kappa_{233} - \kappa_{234} - \kappa_{237} - \kappa_{238} - \kappa_{240} - \kappa_{241} - \kappa_{242} - \kappa_{244} + \kappa_{245} - \kappa_{246} + \kappa_{247} - \kappa_{248} + \kappa_{249} + \kappa_{250} + \kappa_{251} - \kappa_{253} - \kappa_{254} - \kappa_{256} + \kappa_{257} + \kappa_{258} + \kappa_{259} - \kappa_{262} - \kappa_{263} + \kappa_{265} + \kappa_{266} + \kappa_{267} + \kappa_{268} + \kappa_{269} - \kappa_{270} - \kappa_{271} - \kappa_{272} + \kappa_{273} + \kappa_{274} + \kappa_{275} - \kappa_{280} + \kappa_{281} - \kappa_{283} + \kappa_{285} - \kappa_{287} + \kappa_{288} - \kappa_{290} - \kappa_{291} - \kappa_{294} - \kappa_{295} + \kappa_{297} + \kappa_{299} + \kappa_{300} + \kappa_{301} + \kappa_{303} - \kappa_{305} + \kappa_{306} - \kappa_{309} - \kappa_{310} + \kappa_{312} + \kappa_{313} + \kappa_{314} - \kappa_{315} - \kappa_{317} - \kappa_{319} + \kappa_{321} - \kappa_{322} + \kappa_{324} - \kappa_{326} - \kappa_{327} - \kappa_{329} - \kappa_{330} + \kappa_{332} + \kappa_{334} + \kappa_{335} - \kappa_{336} + \kappa_{339} - \kappa_{340} + \kappa_{343} - \kappa_{344} - \kappa_{346} - \kappa_{348} - \kappa_{349} - \kappa_{350} + \kappa_{353} + \kappa_{355} + \kappa_{357} + \kappa_{358} - \kappa_{359} - \kappa_{360} + \kappa_{363} - \kappa_{364} + \kappa_{365} + \kappa_{366} - \kappa_{368} + \kappa_{370} - \kappa_{372} - \kappa_{374} - \kappa_{375} - \kappa_{377} + \kappa_{379} - \kappa_{382} + \kappa_{385} + \kappa_{386} + \kappa_{387} + \kappa_{388} + \kappa_{389} + \kappa_{390} - \kappa_{391} + \kappa_{393} + \kappa_{394} + \kappa_{395} + \kappa_{396} - \kappa_{397} - \kappa_{398} - \kappa_{399} + \kappa_{401} - \kappa_{402} - \kappa_{403} + \kappa_{404} - \kappa_{406} + \kappa_{407} - \kappa_{409} - \kappa_{410} + \kappa_{411} - \kappa_{412} - \kappa_{413} - \kappa_{414} + \kappa_{417} - \kappa_{418} - \kappa_{420} + \kappa_{422} - \kappa_{423} - \kappa_{424} + \kappa_{425} - \kappa_{426} - \kappa_{427} + \kappa_{428} - \kappa_{429} + \kappa_{430} - \kappa_{432} - \kappa_{433} + \kappa_{434} - \kappa_{435} - \kappa_{437} + \kappa_{440} + \kappa_{441} + \kappa_{442} + \kappa_{443} - \kappa_{444} - \kappa_{445} + \kappa_{446} + \kappa_{448} + \kappa_{449} + \kappa_{451} +$

$$\begin{aligned}
& \kappa_{452} + \kappa_{456} - \kappa_{457} + \kappa_{460} + \kappa_{461} + \kappa_{466} - \kappa_{467} + \kappa_{468} + \kappa_{470} + \kappa_{471} - \kappa_{472} - \kappa_{474} - \kappa_{475} - \kappa_{476} + \\
& \kappa_{480} - \kappa_{481} - \kappa_{482} - \kappa_{484} - \kappa_{487} + \kappa_{488} - \kappa_{489} + \kappa_{491} + \kappa_{493} - \kappa_{494} + \kappa_{496} + \kappa_{497} - \kappa_{498} + \kappa_{499} + \\
& \kappa_{500} - \kappa_{501} + \kappa_{502} + \kappa_{504} - \kappa_{505} + \kappa_{506} + \kappa_{507} + \kappa_{509} + \kappa_{512} - \kappa_{513} + \kappa_{516} + \kappa_{517} - \kappa_{519} - \kappa_{520} + \\
& \kappa_{521} + \kappa_{522} + \kappa_{523} - \kappa_{525} + \kappa_{527} + \kappa_{528} - \kappa_{529} + \kappa_{532} + \kappa_{533} - \kappa_{534} - \kappa_{536} + \kappa_{537} - \kappa_{538} - \kappa_{539} - \\
& \kappa_{540} - \kappa_{542} + \kappa_{543} - \kappa_{545} - \kappa_{546} - \kappa_{548} - \kappa_{549} - \kappa_{550} + \kappa_{551} - \kappa_{552} - \kappa_{554} - \kappa_{555} + \kappa_{559} - \kappa_{563} + \\
& \kappa_{564} + \kappa_{566} - \kappa_{567} - \kappa_{568} + \kappa_{569} - \kappa_{571} + \kappa_{572} - \kappa_{573} - \kappa_{575} + \kappa_{576} - \kappa_{577} + \kappa_{578} - \kappa_{580} - \kappa_{581} + \\
& \kappa_{582} - \kappa_{583} - \kappa_{586} - \kappa_{589} - \kappa_{591} - \kappa_{592} - \kappa_{593} - \kappa_{595} - \kappa_{597} - \kappa_{599} - \kappa_{603} + \kappa_{604} + \kappa_{605} - \kappa_{606}
\end{aligned}$$