Mathematica files associated with *Entropy and the beginning of gravitational collapse*, Wren, 2017

Entropy and the beginning of gravitational collapse can be found at https://arxiv.org/abs/1706.03487

All notebooks are offered "as is".

By section and sub-section (excluding figures)

4   The rate of asymptotic coarse-grained entropy creation

4.1   The derivative from the one-particle distribution function for small wave-numbers

Eq. (74)	"2017-06-04 Velocity derivative at small wave-numbers.nb" checks the small wave-number calculation of that equation

4.3   Calculating the rate of entropy creation

Eqs. (81) and (82)	"2017-06-04 Moment identities.nb" checks the moment identities in those equations
Eq. (88) and paragraph before	"2017-06-04 Propagator approach.nb" concludes with carrying out the numerical integration
Paragraph after Eq. (104)	"2017-05-30 New distribution over space - 20ths.nb"
After Eq. (110), and in the remainder of the sub-section	"2017-05-29 New distribution over space - 20ths - zeroth order.nb"

By appendix and sub-appendix (excluding figures)

A   Fourier and Laplace transforms

A3   An ultraviolet cut-off for the acceleration

Eq. (A18)	"2017-06-04 Soft acceleration transform.nb" calculates the sin transform integral

B The plasma dispersion function

B1 Asymptotic series for small wave-numbers

Eq. (B9)   "2017-06-04 P formula.nb" checks the calculation of the series of terms for P

B2 The plasma dispersion relation and its zeros

Eq. (B13)   "2017-06-04 P formula.nb" checks the series for ω which is then used for η

Paragraph of Eq. (B15)   The calculations are in "2017-06-04 Dispersion relation.nb"

B3 Dispersion zeros of relatively large size

Paragraph after Eq. (B25)   "2017-06-04 Dispersion zeros.nb" is used to calculate the quantities mentioned. "k01kJzeros.m" and "k001kJzeros.m' store the results for $k = 0.1k_{\mathrm{J}}$ and $k = 0.01k_{\mathrm{J}}$ respectively

B4 The residue approach for the inverse Laplace transform of the one-particle distribution function

Paragraph of Eq. (B31)   "2017-06-04 Dispersion relation.nb" is used to calculate the limiting value for $k = k_{\mathrm{J}}$.

C Calculations for the zeroth order correlation function

Paragraph after Eq. (C13)   "2017-06-04 Coarse grained correlator.nb" does the required inverse Fourier-transform of the cut-off correlation function.

E Solving the first order correlation equation using a propagator

E3 Solving the correlation equation using propagators

Eq. (E35)   "2017-06-04 Propagator approach.nb" does most of the calculation, while "2017-05-29 Workings for gamma result.nb" checks the second equality

F The Landau approach to deriving the first order correlation function

Eq. (F15) "2017-06-04 Landau approach.nb" does most of the calculations, while "2017-06-04 Showing propagator and Landau approaches give the same result.nb" shows the answer is the same as for the propagator approach

Figures