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

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

Figs. 1 & 2	are plotted in "2017-06-04 Dispersion relation.nb"
Figs. 3 & 4	are plotted in "2017-05-30 New distribution over space - 20ths.nb" and the results are stored in "2017-05-30 New distribution over space 20ths.m"
Figs. 5 & 6	are plotted in "2017-05-29 New distribution over space - 20ths - zeroth order.nb" and the results are stored in "2017-05-29 New distribution over space 20ths zeroth order.m"
Figs. B1, B2 & B3	are plotted in "2017-06-04 Dispersion relation.nb"
Fig. B4	is plotted in "2017-06-04 Dispersion zeros.nb"