DATA FILES FOR THE ALGEBRAIC NOVIKOV, ADAMS, AND ADAMS-NOVIKOV SPECTRAL SEQUENCES

DANIEL C. ISAKSEN, GUOZHEN WANG, AND ZHOULI XU

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This document describes the structure of some comma-separated-value (CSV) files that contain detailed information about the algebraic Novikov, Adams, and Adams-Novikov spectral sequences, in both the classical and $\mathbb{C}$-motivic contexts. These files are auxiliary to the projects described in [1], [2], [3], and [4].

See the cited documents for more mathematical details. The remainder of this document describes the structure of the CSV files.

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1. Classical Adams spectral sequence

Adams-classical-E2.csv: Each line of the file corresponds to an element in the classical Adams E_2-page. This data is used to produce the chart appearing in [3].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

shift: Used for display purposes in reference to the chart in [3], when more than one element occurs with the same bidegree. Lower values correspond to dots on the left.

h0info: Information about special behavior of an h_0 extension.
`loc` means that an element is h_0-periodic.
`p` means that an h_0 extension is not known to occur.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an Adams differential. An integer value r indicates a d_r differential.
`p` means that a differential is not known to occur.

drtarget: Value of an Adams d_r differential.

Adams-classical-Einfty.csv: Each line of the file corresponds to an element in the classical Adams E_∞-page. This data is used to produce the chart appearing in [3].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

shift: Used for display purposes in reference to the chart in [3], when more than one element occurs with the same bidegree. Lower values correspond to dots on the left.

h0info: Information about special behavior of an h_0 extension.
`loc` means that an element is h_0-periodic.
`h` means that there is a hidden 2 extension.
`h ?` means that there is a possible hidden 2 extension.
`p` means that an h_0 extension is not known to occur.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.

h1info: Information about special behavior of an h_1 extension.
`h` means that there is a hidden η extension.
`h ?` means that there is a possible hidden η extension.
`p` means that the h_1 extension is not known to occur.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2info: Information about special behavior of an h_2 extension.
`h` means that there is a hidden η extension.
`p` means that the h_1 extension is not known to occur.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an Adams differential. An integer value r indicates a d_r differential.
`p` means that the differential is not known to occur.

drtarget: Value of an Adams d_r differential.

Adams-classical-Einfty-extn.csv: Each line of the file corresponds to a hidden extension by 2, η, or ν in the classical Adams E_∞-page. This data is used to produce the chart appearing in [3].

source: Source of an extension. (Beware that naming conventions have changed over time.)

type: Type of extension.
`h0` means an extension by 2.
`h1` means an extension by η.
`h2` means an extension by ν.

stem: The stem of the source of an extension. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of the source of an extension. This is the vertical coordinate in a standard Adams chart.

info: Information about special behavior of an extension.
`?` means that an extension is not known to occur.

target: Target of an extension.

sourcex, sourcey, targetx, targety: Used for display purposes in reference to the chart in [3], when a curved hidden extension is necessary. Gives the tangent vectors at the source and target.

2. $\mathbb{C}$-motivic Adams spectral sequence

Adams-motivic-E2.csv: Each line of the file corresponds to an element in the motivic Adams E_2-page. This data is used to produce the chart appearing in [3].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

tautorsion: Indicates the τ module structure of an element.
`0` means that an element is τ-periodic.
Any other integer k means that an element is annihilated by τ^k.

shift: Used for display purposes in reference to the chart in [3], when more than one element occurs with the same bidegree. Lower values correspond to dots on the left.

h0info: Information about special behavior of an h_0 extension.
`p` means that an h_0 extension is not known to occur. `t` means that an h_0 extension equals τ times an element.
`t` followed by an integer k means that an h_0 extension equals τ^k times an element.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.
`loc` means that an element is h_0-periodic.

h1info: Information about special behavior of an h_1 extension.
`p` means that an h_1 extension is not known to occur. `t` means that an h_1 extension equals τ times an element.
`t` followed by an integer k means that an h_1 extension equals τ^k times an element.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.
`loc` means that an element is h_1-periodic.

h2info: Information about special behavior of an h_2 extension.
`p` means that an h_2 extension is not known to occur. `t` means that an h_2 extension equals τ times an element.
`t` followed by an integer k means that an h_2 extension equals τ^k times an element.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an Adams d_2 differential.
`free` means that the target of the differential is not displayed on the chart, typically because it is h_1-periodic.
`p` means that a differential is not known to occur.
`t` means that a differential equals τ times an element.
`t` followed by an integer k means that a differential equals τ^k times an element.

drtarget: Value of an Adams d_2 differential.

Adams-motivic-E3.csv: Each line of the file corresponds to an element in the motivic Adams E_3-page. This data is used to produce the chart appearing in [3]. This file takes the same format as **Adams-motivic-E2.csv**.

Adams-motivic-E4.csv: Each line of the file corresponds to an element in the motivic Adams E_4-page. This data is used to produce the chart appearing in [3]. This file takes the same format as **Adams-motivic-E2.csv**.

Adams-motivic-E5.csv: Each line of the file corresponds to an element in the motivic Adams E_5-page. This data is used to produce the chart appearing in [3]. This file takes the same format as **Adams-motivic-E2.csv**.

Adams-motivic-E6.csv: Each line of the file corresponds to an element in the motivic Adams E_6-page. This data is used to produce the chart appearing in [3]. This file takes the same format as **Adams-motivic-E2.csv**.

Adams-motivic-Einfty.csv: Each line of the file corresponds to an element in the motivic Adams E_∞-page. This data is used to produce the chart appearing in [3]. This file takes the same format as **Adams-motivic-E2.csv**.

Adams-motivic-Einfty-extn.csv: Each line of the file corresponds to a hidden extension by τ in the $\mathbb{C}$-motivic Adams E_∞-page. This data is used to produce the chart appearing in [3].

source: Source of an extension. (Beware that naming conventions have changed over time.)

stem: The stem of the source of an extension. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of the source of an extension. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

info: Information about special behavior of an extension.
`?` means that an extension is not known to occur.

target: Target of an extension.

sourcex, sourcey, targetx, targety: Used for display purposes in reference to the chart in [3], when a curved hidden extension is necessary. Gives the tangent vectors at the source and target.

3. Adams-Novikov spectral sequence

ANSS-v1periodic-E2.csv: Each line of the file corresponds to a v_1-periodic element in the Adams-Novikov E_2-page. This data is used to produce the chart appearing in [4].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams-Novikov filtration: The Adams-Novikov filtration of an element. This is the vertical coordinate in a standard Adams-Novikov chart.

order: $\log_2$ of the order of an element.

h1info: Information about special behavior of an h_1 extension.
`loc` means that an element is h_1-periodic.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an Adams-Novikov differential.
An integer r means that there is a d_r differential.

drtarget: Value of an Adams-Novikov differential.

ANSS-v1periodic-Einfty.csv: Each line of the file corresponds to a v_1-periodic element in the Adams-Novikov E_∞-page. This data is used to produce the chart appearing in [4].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams-Novikov filtration: The Adams-Novikov filtration of an element. This is the vertical coordinate in a standard Adams-Novikov chart.

order: $\log_2$ of the order of an element.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

ANSS-v1periodic-Einfty-extn.csv: Each line of the file corresponds to a hidden extension between v_1-periodic elements in the Adams-Novikov E_∞-page. This data is used to produce the chart appearing in [4].

source: Source of an extension. (Beware that naming conventions have changed over time.)

type: Type of extension.
`h0` means an extension by 2.

stem: The stem of the source of an extension. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams-Novikov filtration: The Adams-Novikov filtration of the source of an extension. This is the vertical coordinate in a standard Adams-Novikov chart.

target: Target of an extension.

ANSS-E2.csv: Each line of the file corresponds to an element in the Adams-Novikov E_2-page, excluding v_1-periodic elements. This data is used to produce the chart appearing in [4].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams-Novikov filtration: The Adams-Novikov filtration of an element. This is the vertical coordinate in a standard Adams-Novikov chart.

order: $\log_2$ of the order of an element.

shift: Used for display purposes in reference to the chart in [4], when more than one element occurs with the same bidegree. Lower values correspond to dots on the left.

h1info: Information about special behavior of an h_1 extension.
An integer k means that the h_1 extension equals 2^k times a generator.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2info: Information about special behavior of an h_2 extension.
An integer k means that the h_2 extension equals 2^k times a generator.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an Adams-Novikov differential.
An integer r means that there is a d_r-differential.
`?` means that a differential is not known to occur.

drtarget: Value of an Adams-Novikov differential.

ANSS-E4.csv: Each line of the file corresponds to an element in the Adams-Novikov E_4-page, excluding v_1-periodic elements. This data is used to produce the chart appearing in [4]. This file takes the same format as **ANSS-E2.csv**.

ANSS-E6.csv: Each line of the file corresponds to an element in the Adams-Novikov E_6-page, excluding v_1-periodic elements. This data is used to produce the chart appearing in [4]. This file takes the same format as **ANSS-E2.csv**.

ANSS-Einfty.csv: Each line of the file corresponds to an element in the Adams-Novikov E_∞-page, excluding v_1-periodic elements. This data is used to produce the chart appearing in [4]. This file takes the same format as **ANSS-E2.csv**.

ANSS-Einfty-extn.csv: Each line of the file corresponds to a hidden extension by 2, η, or ν in the Adams-Novikov E_∞-page. This data is used to produce the chart appearing in [4].

source: Source of an extension. (Beware that naming conventions have changed over time.)

type: Type of extension.
`h0` means an extension by 2.
`h1` means an extension by η.
`h2` means an extension by ν.

stem: The stem of the source of an extension. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams-Novikov filtration: The Adams-Novikov filtration of the source of an extension. This is the vertical coordinate in a standard Adams-Novikov chart.

info: Information about special behavior of an extension.
`?` means that an extension is not known to occur.

target: Target of an extension.

sourcex, sourcey, targetx, targety: Used for display purposes in reference to the chart in [4], when a curved hidden extension is necessary. Gives the tangent vectors at the source and target.

4. h_1-Bockstein spectral sequence for the algebraic Novikov E_2-page

algNovikov-h1periodic-E0.csv Each line of the file corresponds to an element in the E_0-page of the h_1-Bockstein spectral sequence that converges to part of the algebraic Novikov E_2-page. This data is used to produce the chart appearing in [2].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

cell: Indicates whether an element is detected by the top cell or the bottom cell of the cofiber of τ.
`0` means that an element is in the image in Ext of inclusion of the bottom cell.
`1` means that an element maps non-trivially in Ext under projection to the top cell.

shift: Used for display purposes in reference to the chart in [3], when more than one element occurs with the same bidegree. Lower values correspond to dots on the left.

h1info: Information about special behavior of an h_1 extension.
`?` means that an h_1 extension is not known to occur.
`h` means that an h_1 extension is hidden, in the sense that its source is detected by the top cell of the cofiber of τ, while its target is detected by the bottom cell.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.
`loc` means that an element is h_1-periodic.

drinfo: Information about a Bockstein differential.
An integer r means that there is a Bockstein d_r differential.
`?` means that a differential is not known to occur.

drtarget: Value of a Bockstein differential.

algNovikov-h1periodic-Einfty.csv Each line of the file corresponds to an element in the E_∞-page of the h_1-Bockstein spectral sequence that converges to part of the algebraic Novikov E_2-page. This data is used to produce the chart appearing in [2]. This file takes the same format as **algNovikov-h1periodic-E0.csv**.

5. Algebraic Novikov spectral sequence

algNovikov-E2.csv: Each line of the file corresponds to an element in the algebraic Novikov E_2-page. This data is used to produce the chart appearing in [2].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

cell: Indicates whether an element is detected by the top cell or the bottom cell of the cofiber of τ.
`0` means that an element is in the image in Ext of inclusion of the bottom cell.
`1` means that an element maps non-trivially in Ext under projection to the top cell.

h0info: Information about special behavior of an h_0 extension.
`h` means that an h_0 extension is hidden, in the sense that its source is detected by the top cell of the cofiber of τ, while its target is detected by the bottom cell.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.
`loc` means that an element is h_0-periodic.

h1info: Information about special behavior of an h_1 extension.
`?` means that an h_1 extension is not known to occur.
`h` means that an h_1 extension is hidden, in the sense that its source is detected by the top cell of the cofiber of τ, while its target is detected by the bottom cell.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.
`loc` means that an element is h_1-periodic.

h2info: Information about special behavior of an h_2 extension.
`h` means that an h_2 extension is hidden, in the sense that its source is detected by the top cell of the cofiber of τ, while its target is detected by the bottom cell.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

drinfo: Information about an algebraic Novikov differential.
An integer r means that there is d_r differential.
`?` means that a differential is not known to occur.

drtarget: Value of an algebraic Novikov differential.

algNovikov-E3.csv: Each line of the file corresponds to an element in the algebraic Novikov E_3-page. This data is used to produce the chart appearing in [2]. This file takes the same format as **algNovikov-E2.csv**.

algNovikov-E4.csv: Each line of the file corresponds to an element in the algebraic Novikov E_4-page. This data is used to produce the chart appearing in [2]. This file takes the same format as **algNovikov-E2.csv**.

algNovikov-E5.csv: Each line of the file corresponds to an element in the algebraic Novikov E_5-page. This data is used to produce the chart appearing in [2]. This file takes the same format as **algNovikov-E2.csv**.

algNovikov-Einfty.csv: Each line of the file corresponds to an element in the algebraic Novikov E_∞-page. This data is used to produce the chart appearing in [2].

name: Human-readable name of an element. (Beware that naming conventions have changed over time.)

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

cell: Indicates whether an element is detected by the top cell or the bottom cell of the cofiber of τ. An empty cell means that an element lies beyond the range that has been analyzed.
`B` means that an element is in the image in homotopy of inclusion of the bottom cell.
`T` means that an element maps non-trivially in homotopy under projection to the top cell.
`?` means that it is not known whether an element is detected by the bottom cell or the top cell.
`!` means that there is a hidden value of inclusion of the bottom cell or of projection to the top cell.

h0info: Information about special behavior of an h_0 extension.
`h` means that there is a hidden 2 extension.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.
`loc` means that an element is h_0-periodic.

h1info: Information about special behavior of an h_1 extension.
`h` means that there is a hidden η extension.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.
`loc` means that an element is h_1-periodic.

h2info: Information about special behavior of an h_2 extension.
`h` means that there is a hidden ν extension.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

algNovikov-Einfty-extn.csv: Each line of the file corresponds to a hidden extension by 2, η, or ν in the Adams-Novikov E_∞-page. This data is used to produce the chart appearing in [2]. Not all hidden extensions appear in this file; only the ones that require curved lines are listed.

source: Source of an extension. (Beware that naming conventions have changed over time.)

type: Type of extension.
`h0` means an extension by 2.
`h1` means an extension by η.
`h2` means an extension by ν.

stem: The stem of the source of an extension. This is the horizontal coordinate in a standard Adams-Novikov chart.

Adams filtration: The Adams-Novikov filtration of the source of an extension. This is the vertical coordinate in a standard Adams-Novikov chart.

weight: The motivic weight of an element.

target: Target of an extension.

sourcex, sourcey, targetx, targety: Used for display purposes in reference to the chart in [2], when a curved hidden extension is necessary. Gives the tangent vectors at the source and target.

6. Machine generated data

Adams-motivic-E2-machine.csv: Each line of the file corresponds to an $\mathbb{F}_2[\tau]$-module generator of the $\mathbb{C}$-motivic Adams E_2-page.

name: An arbitrary name of the form `{a-b}` assigned by machine to a generator. The value of `a` is the Adams filtration of the generator, while the value of `b` is an arbitrary number.

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

tautorsion: Indicates the τ module structure of a generator.
`0` means that an element is τ-periodic.
Any other integer k means that a generator is annihilated by τ^k.

h0info: Information about special behavior of an h_0 extension.
An integer k means that an h_0 extension equals τ^k times a generator.

h0target: Value of an h_0 extension. An empty cell indicates that there is no h_0 extension.

h1info: Information about special behavior of an h_1 extension.
An integer k means that an h_1 extension equals τ^k times a generator.

h1target: Value of an h_1 extension. An empty cell indicates that there is no h_1 extension.

h2info: Information about special behavior of an h_2 extension.
An integer k means that an h_2 extension equals τ^k times a generator.

h2target: Value of an h_2 extension. An empty cell indicates that there is no h_2 extension.

h3info: Information about special behavior of an h_3 extension.
An integer k means that an h_3 extension equals τ^k times a generator.

h3target: Value of an h_3 extension. An empty cell indicates that there is no h_3 extension.

algNovikov-machine.csv: Each line of the file corresponds to an element in the algebraic Novikov E_2-page.

name: An arbitrary name assigned by machine to a generator.

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

h0target: Value of an h_0 extension in the Adams-Novikov E_2-page. An empty cell indicates that there is no h_0 extension. Beware that these are not extensions in the algebraic Novikov E_2-page.

h1target: Value of an h_1 extension in the Adams-Novikov E_2-page. An empty cell indicates that there is no h_1 extension. Beware that these are not extensions in the algebraic Novikov E_2-page.
`loc` indicates that an element is h_1-periodic.

h2target: Value of an h_2 extension in the Adams-Novikov E_2-page. An empty cell indicates that there is no h_2 extension. Beware that these are not extensions in the algebraic Novikov E_2-page.

h3target: Value of an h_3 extension in the Adams-Novikov E_2-page. An empty cell indicates that there is no h_3 extension. Beware that these are not extensions in the algebraic Novikov E_2-page.

drinfo: Information about an algebraic Novikov differential.
An integer value r indicates a d_r differential.

drvalue: Value of an algebraic Novikov d_r differential.

ANSS-cofiber-2-machine.csv: Each line of the file corresponds to an element in the Adams-Novikov E_2-page for the cofiber of 2.

name: An arbitrary name assigned by machine to a generator.

cell:
`B` indicates that an element lies in the image of the bottom cell.
`T` indicates that an element projects non-trivially to the top cell.

image: Indicates the pre-image of an element under inclusion of the bottom cell, or the value under projection to the top cell.

stem: The stem of an element. This is the horizontal coordinate in a standard Adams chart.

Adams filtration: The Adams filtration of an element. This is the vertical coordinate in a standard Adams chart.

weight: The motivic weight of an element.

Adams-Novikov filtration: The Adams-Novikov filtration of an element. This is the vertical coordinate in a standard Adams-Novikov chart.

h1target: Value of an extension by `[1-0]`, i.e., by h_1. An empty cell indicates that there is no extension.

h2target: Value of an extension by `[1-1]`, i.e., by h_2. An empty cell indicates that there is no extension.

h3target: Value of an extension by `[1-2]`, i.e., by h_3. An empty cell indicates that there is no extension.

theta2: Value of an extension by `v2^1[1-0]`, i.e., by the element that maps to h_2^2 under projection to the top cell.

theta3: Value of an extension by `[1-3]`, i.e., by the element that maps to h_3^2 under projection to the top cell.

theta4: Value of an extension by `[1-4]`, i.e., by the element that maps to h_4^2 under projection to the top cell.

theta5: Value of an extension by `[1-5]`, i.e., by the element that maps to h_5^2 under projection to the top cell.

ANSS-conversion-machine.csv: Converts between arbitrary names for elements in the Adams-Novikov E_2-page used in the two previous machine-generated files.

ANSS-cofiber-2-machine: Used in the *image* column of **ANSS-cofiber-2-machine.csv**.

algNovikov-machine: Used in the *name* column of **algNovikov-machine.csv**.

References

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Department of Mathematics, Wayne State University, Detroit, MI 48202, USA
E-mail address: isaksen@wayne.edu

Shanghai Center for Mathematical Sciences, Fudan University, Shanghai, China, 200433
E-mail address: wangguozhen@fudan.edu.cn

Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA 02139
E-mail address: xuzhouli@mit.edu