Manual for Package: sediment-transport
Revision 1:7M

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August 11, 2020

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2.1 Hermite_profile

```
suspended sedimen profile in form of a hermite polynomial
```

2.2 fit

```
fit suspended sediment profile
```

2.3 predict

```
predict suspended sediment concentration
```

2.4 regmtx

```
regression matrix
```

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```
hermite profile
```

3 @Nodal_Point

3.1 Adot

```
ODE of the nodal point relation (time-derivative of branch cs-area)
```

3.2 Nodal_Point

```
Nodal point relation for bifurcations, according to Wang
```

3.3 Qs_in

```
sediment entering branches
```

3.4 Qs_out

```
sediment leaving branches
```

3.5 derive_jacobian

```
derive Jacobian of the nodal point relation
```

3.6 discharge

```
discharge through branches
there is a problem with this relation, as soon as the bed of one
    channel is perturbed,
the water level at the bifurcation changes, so the depth of the
    second channel is not
entirely independent
```

3.7 geometry

```
cross section geometry of branches
```

3.8 jacobian

```
jacobian of the nodal point relation
semi-autogenerated
```

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```
phase diagram
```

3.10 phase_diagram_wang

```
phase diagram of Nodal point relation
```

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```

3.12 stability_analysis

```
staility analysis for a given configuration
```

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```
parabolic-constant profile
```

4.2 fit

```
fit the suspended sediment concentration profile
```

4.3 predict

```
predict suspended sediment concentration
```

4.4 regmtx

```
regression matrix
```

4.5 transform

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transformation of vertical coordinate
```

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suspended sediment concentration profile
```

5.2 fit

```
fit the suspended sediment concentration profile
```

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5.4 predict

```
predict the suspended sediment concentration
```

5.5 regmtx

```
regression matrix
```

5.6 rouse_number

```
rouse number (suspension number) for given grain siye and shear
    velocity
```

5.7 rouse_number_to_grain_diameter

```
convert known rous number (suspension parameter) to grain size
    diameter
```

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5.9 transform

```
transform the vertical coordinate
```

6 sediment-transport

analysis and prediction of fluvial sediment transport and morphodynamics

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6.2 adaptation_length_armanini

6.3 adaptation_length_bed

adaptatoion lenght of bed morphology

6.4 adaptation_length_flow

adaption length of the flow

6.5 angle_of_repose

6.6 bar_mode_crosato

bar mode of a river according to crosato

6.7 bed_layer_thickness

6.8 bed_load_einstein

bed load transport according to einstein jr.

6.9 bed_load_engelund_fredsoe

```
bed load transport according to engelund and fredsoe
```

6.10 bed_load_transport_mpm

```
bed load transport rate according to meyer-peter-mueller
```

6.11 bed_load_transport_rijn

```
bed load transport
method of van Rijn (1984)

function [Q_b q_b Phi_b] = bed_load_transport_rijn(C,d50,d90,U,d,b)

d50 [mm] (converted to m)
d90 [mm] (converted to m)

d : depth
b : width
```

6.12 bed_load_transport_wu

```
bed load transport according to Wu
```

6.13 bedform_dimension_rijn

```
bed form dimensions
cf. rijn 1984 iii
```

6.14 bedform_roughness_rijn

```
form drag according to van Rijn
```

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6.16 bedload_direction

```
bedload transport direction
```

6.17 bedload_layer_thickness_mclean

6.18 bedload_transport_ashida_michue_1972

6.19 bedload_transport_bagnold_1941

6.20 bedload_transport_bagnold_1973

6.21 bedload_transport_egashira

6.22 bifurcation_critical_aspect_ratio

```
critical aspect ratio of a bifurcation
c.f. redolfi and pittaluga
```

6.23 chezy_einstein

```
chezey coefficient according to Einstein
```

6.24 chezy_roughness_engelund_fredsoe

```
chezy rougness according to engelund and fredsoe
```

6.25 critical_grain_size

```
critical grain size for a given shear velocity
```

6.26 critical_shear_stress

```
critical shear Stress
```

6.27 critical_shear_stress_ratio

```
critical shields parameter
aka critical shear stress ratio
aka shields curve
```

6.28 critical_shear_stress_wiberg

6.29 critical_shear_stress_wu

```
critical shear stress, according to wu
```

6.30 critical_shear_velocity

```
critical shear velocity
```

6.31 derive_combined_transport

6.32 derive_critical_grain_size

6.33 derive_mpm_foramtive_discharge

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`dimensionless grain size`

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6.41 dune_dimension_julien_klaasen_1978

6.42 dune_dimension_yalin

6.43 dune_height_karim

6.44 dynamic_shear_stress

```
dynamic shear stress
```

6.45 formative_discharge

6.46 fractional_transport_engelund_hansen

```
fractional sediment transport according to engelund and hansen
```

6.47 grain_roughness_mpm

6.48 grain_roughness_nikuradse

6.49 grain_roughness_rijn

```
grain roughness (skin friction) according to van Rijn
```

6.50 grain_roughness_wu

6.51 grain_size_from_shear_stress

6.52 hiding_exposure_wu

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6.55 matching_level_mclean

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6.60 reference_concentration_einstein

6.61 reference_concentration_mclean

6.62 reference_concentration_mclean_2

```
reference concentration according to smith and mclean
```

6.63 reference_concentration_rijn

6.64 reference_concentration_wright_parker

6.65 reference_concentration_zyserman_fredsoe

6.66 reference_height_rijn

6.67 reference_level_mclean

6.68 reference_to_flux_averaged_concentration_rijn

6.69 roughness_height_mclean

6.70 roughness_height_mclean_1972

6.71 saltation_layer_thickness

6.72 sediment_load_ART_syvitski_2003

6.73 sediment_load_ART_syvitski_2003b

6.74 sediment_transport_directed

```
directed sediment transport
```

6.75 sediment_transport_relation_fit

6.76 sediment_transport_relation_predict

6.77 sediment_transport_scale

6.78 sediment_transport_waves

```
sediment transport by waves
```

6.79 settling_time_constant_eddy_viscosity

6.80 settling_velocity

```
Settling velocity
5.23d in julien-2010
settling velocity according to cheng
settling velocity in water
stokes settling velocity
d : [mm] diameter of sediment particle
ws : [m/s] settling velocity
          signed ws < 0 : falling
(Note: was R, radius in m)

valid for small particles
```

6.81 settling_velocity_to_diameter

```
invert settling velocity to diameter
```

6.82 shear2shields

6.83 shear_velocity_mclean

6.84 shields_number

```
normalized shear stress, shear stress ratio
```

6.85 skin2total_stress_ratio

6.86 skin_2_total_friction_eh

```
skin friction to total friction conversion according to engelund
    and hansen
function [theta,C] = skin_2_total_friction_eh(theta_t,Ct)
```

6.87 stratification_parameter_rijn

6.88 stratification_parameter_wright_parker

6.89 stratification_profile_mclean

6.90 suspended_grain_size

```
suspended grain size distribution based on bed material grain size
    distribution

assumes that probability of suspension is inverse proportional to
    grain diameter
as in Engelund-Hansen transport relation
- no hiding effects considered
- no threshold for large grains applied
- no flocking considered
note: actual distribution varies with the depth

d    : [1xnd] grain size in arbitrary units (on linear, not on log
    scale)
h_bed : [nsxnd] fractions of sediment of size d
```

6.91 suspended_grain_size_non_linear

```
suspended grain size distribution based on bed material grain size
    distribution

assumes that probability of suspension is inverse proportional to
    grain diameter
as in Engelund-Hansen transport relation
- no hiding effects considered
- no threshold for large grains applied
- no flocking considered
note: actual distribution varies with the depth
```

```
d    : [1xnd] grain size in arbitrary units (on linear, not on log
    scale)
h_bed : [nsxnd] fractions of sediment of size d
```

6.92 suspended_grain_size_rijn

```
grain size of the suspended sediment according to van rijn,
    empirical
```

6.93 suspended_sediment_adaptation_length_claudin

6.94 suspended_transport_mclean

```
vertical profile of the suspended sediment according to McLean
u := us/kappa*log(z/z0);
I = 1/(int_a^h c dz int_a^h u dz) int_a^h c u dz
```

6.95 suspended_transport_rijn

```
suspended load transport according to van Rijn
```

6.96 suspended_transport_van_rijn_simplified_1984

6.97 suspended_transport_wright_parker

6.98 suspended_transport_wu

```
suspended sediment transport according to widthu
```

6.99 suspension_parameter

7 test

7.1 test_Rouse_profile_fit

7.2 test_adaptation_length_bed

7.3 test_bed_load_transport_rijn

7.4 test_bedform_roughness_rijn_2007

7.5 test_bedload_transport_mpm

7.6 test_critical_shear_stress

7.7 test_sediment_transport

7.8 test_sediment_transport_engelund_hansen_1

7.9 test_sediment_transport_engelund_hansen_2

7.10 test_sediment_transport_karim

7.11 test_sediment_transport_rijn

7.12 test_settling_velocity_to_diameter

8 sediment-transport

```
analysis and prediction of fluvial sediment transport and
    morphodynamics
```

8.1 test_sediment_transport_relation

8.2 test_suspended_transport_mclean

8.3 test_suspended_transport_wright_parker

8.4 test_total_transport_engelund_hansen

8.5 test_total_transport_yang

8.6 total2skin_stress_ratio

8.7 total_2_skin_friction

8.8 total_roughness_engelund_fredsoe

```
roughness lenght according to engelund and fredsoe
```

8.9 total_roughness_engelund_fredsoe2

8.10 total_roughness_karim

8.11 total_roughness_karim2

8.12 total_roughness_length_mclean

8.13 total_roughness_parker

8.14 total_roughness_rijn

```
total roughness according to van rijn
```

8.15 total_roughness_yalin

8.16 total_to_skin_stress_kishi

8.17 total_transport_ackers_white

8.18 total_transport_bagnold

```
total sediment transport accoding to bagnold
```

8.19 total_transport_eh_distribution

```
total sediment transport according to engelund hansen
for a given graqin size distribution
```

8.20 total_transport_engelund_hansen

```
total sediment transport according to Engelund and Hansen
```

8.21 total_transport_engelund_hansen_2

```
sediment transport according to engelund and hansen
```

8.22 total_transport_karim

8.23 total_transport_rijn

```
total sediment transport according to van rijn
```

8.24 total_transport_wu

```
total sediment transport according to wu 2000b
```

8.25 total_transport_yang

8.26 transport_stage_mclean

```
transport stage according to McLean
```

8.27 transport_stage_rijn

```
transport stage as defined by van Rijn
```

8.28 vertical_ssc_profile_exponential

8.29 vertical_ssc_profile_mclean

```
vertical profile of the suspended sediment according to McLean
```

8.30 viscosity_correction_sediment