Dès **aujourd'hui et jusqu'au dimanche 13 octobre à minuit**, vous aurez l'occasion de recueillir l'avis des étudiantes et étudiants inscrit·es à vos cours Bachelor, Master, CMS et MAN, grâce à **l'évaluation indicative sur l'enseignement**.

Ce feedback indicatif invite les étudiantes et étudiants à répondre à une question unique ("*Le déroulement du cours permet ma formation et un climat de classe approprié*"), en ajoutant, si souhaité, un commentaire. Vous trouverez plus de détails sur le fonctionnement du système de retour indicatif au bas de cet email.

Cette démarche a lieu en début de semestre, afin de vous laisser plus de temps pour pallier les éventuels problèmes qui vous seront rapportés. Il ne s'agit pas d'une évaluation de votre enseignement, mais seulement d'une opportunité d'obtenir un premier retour d'information.

Le retour de vos étudiantes et étudiants vous sera d'autant plus utile si le taux de réponse de votre classe est élevé, raison pour laquelle nous vous invitons à **les motiver à se connecter à ISA pour donner leur feedback**. En plus de ce retour d'information rapide, chaque cours fera l'objet d'une **évaluation approfondie à la fin du semestre**. Vous recevrez plus d'informations à ce sujet au cours de la semaine 6.

Nous vous remercions de votre attention et vous souhaitons une bonne suite de semestre.

Pierre Dillenbourg, Vice-président associé pour l'Education
Roland Tormey, Chef du CAPE

Informations complémentaires sur le retour indicatif :

Marche à suivre pour accéder au retour indicatif sur ISA:

- Connectez-vous au portail IS-Academia avec votre compte Gaspar : https://isa.epfl.ch
- Cliquez sur 'mes cours'
- La liste de vos cours apparaîtra sur le côté gauche de l'écran. Un lien vers 'comparaison' se trouve au haut du menu central
- Une fois la période du retour indicatif terminée, vous pourrez accéder à l'entier de vos statistiques
- Une liste complète des commentaires des étudiant.es est disponible au format html ou Excel
- Divers types de graphiques sont disponibles

Qui participe au feedback indicatif?

- Tout le corps estudiantin de l'EPFL peut donner un feedback sur l'ensemble des cours de niveau Bachelor, Master et CMS.
- A condition d'être inscrit·es chez nous, les étudiantes et étudiants externes peuvent également participer à l'évaluation pour les cours suivis à l'EPFL.
- Les doctorantes et les doctorants qui suivent des cours de Master pourront s'exprimer, mais les cours de l'Ecole Doctorale font l'objet d'une autre procédure.

Caractéristiques du système :

- Le formulaire est disponible sur IS-Academia, en anglais. Pour en changer la langue, choisissez 'en' ou 'fr' au haut de la page d'accueil.
- Le retour des étudiant.es est anonyme. Pour des raisons de confidentialité, les résultats ne sont affichés que lorsqu'il y a plus de 5 réponses.

En cas de difficultés:

From **today until midnight Sunday 13 October,** you will have an opportunity to get feedback from students on your Bachelor, Master, CMS and MAN courses through the **Indicative Student Feedback on Teaching**.

This feedback system asks students to respond to a single question about the course ("*The running of the course enables my learning and an appropriate class climate*"), with an opportunity for students to provide comments. Details on the operation of the system are provided below.

The indicative feedback happens early in the semester in order to allow you time to address any possible issues coming up. It is not intended as an evaluation of your teaching - only as an opportunity for quick feedback.

Student feedback is more likely to be useful to you if your class response rate is high, therefore it would be worthwhile for you to **encourage your students to go to ISA** and respond to the Indicative Feedback. Alongside this rapid feedback, each course will also have an **in-depth evaluation at the end of the semester**. You will receive more information on that in week 6.

With kind regards,

Pierre Dillenbourg, Associate Vice-President for Education
Roland Tormey, Head of CAPE

Additional Information on Indicative Feedback:

How it works for teachers:

- Connect to IS-Academia portal using your Gaspar account: https://isa.epfl.ch
- Click on 'my courses'
- Your courses will appear on the left hand side of the screen.
- After the indicative feedback period, you will have access to the complete statistics in the tab "Comparaison".
- A complete list of student comments can be obtained in html or Excel format.
- Multiple types of graphics can be obtained.

Who participates:

- Teachers of all Bachelor, Master and CMS courses get indicative student feedback every semester.
- External students, taking courses at EPFL, will be able to provide feedback as long as they are correctly registered. UNIL students taught in the same classes as EPFL students will also participate.
- PhD students will be able to give feedback on the master courses they are following, but courses of the Doctoral School are dealt through another procedure.

Features of the system:

- The form is available in English within IS-Academia. To change the language, choose "en" or "fr" at the top of the home page.
- Student feedback is anonymous. To assure student confidentiality, the results are only shown when more than 5 answers are available.

In case of difficulties:

Graded exercise 1

- Graded Exercise 1 will be available on moodle after this lecture, and the solutions must be uploaded to moodle before midnight Wednesday, 16th October

- Submit early in case of glitches with the system

- Each person must submit their own solution, no photocopies, nor one person in a group submitting a single solution for several

- All questions can be done by hand except plotting the phase portrait, which needs python / other plotter (put both in a pdf); or, you can turn in a **working** jupyter notebook with the solution with manual calculations embedded; or both pdf and notebook.

Background quiz

DISCOVER EPFL'S

MAKE PROJECTS IN LIFE SCIENCES

Tuesday 15th of October
5:15 PM
SV1717

Register here

Pizza and apero!

Background quiz: go.epfl.ch/turningpoint

Session Id: julian23

All input is anonymous; data are stored outside CH

Break

Summary

Recipe for solving 2D linear problems: d**X**/dt = **M X = 0**

1) Find τ = Tr M and Δ = det M, and locate the FP on the (τ, Δ) graph.
   Check for the marginal cases that lie on the curve τ**2 - 4*Δ = 0.
   (stop here if all you need is the FP and its stability).

2) Find the nullclines where dx/dt = 0 or dy/dt = 0. Find the sign of the other gradient along the nullclines, i.e., where is dy/dt positive and negative along the line dx/dt = 0? Mark the direction of the vector field on the nullclines.

3) Find eigenvalues and eigenvectors of **M**. Note that eigenvectors (and nullclines) are infinite straight lines for linear problems.

4) On the phase portrait, draw the nullclines and the eigenvectors, sketch the vector field around them using the equations for dx/dt and dy/dt.

5) Sketch some trajectories that fit with the nullclines and the eigenvectors (stop here if all you need is qualitative/pictorial solution.)

6) Find the complete trajectory from an initial point (x_0,y_0) by determining the constants c_1, c_2 in the general solution.

The 2D linear system d**X**/dt = **M X** has one isolated fixed point at the origin that determines trajectories for the WHOLE phase portrait (if det **M** ≠ 0).

The type of FP is determined by the trace and determinant of the matrix **M** only.

If det M < 0, it's a saddlepoint.

det M = 0, non-isolated FP.

If det M > 0 and …

If Tr M < 0, FP is stable; if Tr M > 0 , FP is unstable. In both cases:

If τ**2 - 4*Δ < 0, it's a spiral,

else if τ**2 - 4*Δ > 0, it's a node,

else if τ**2 - 4*Δ = 0, it's a star or degenerate node.

In all cases, the stability is given by the sign of Tr M.

If det M > 0 and Tr M = 0, it's a centre, i.e., circles/ellipses.

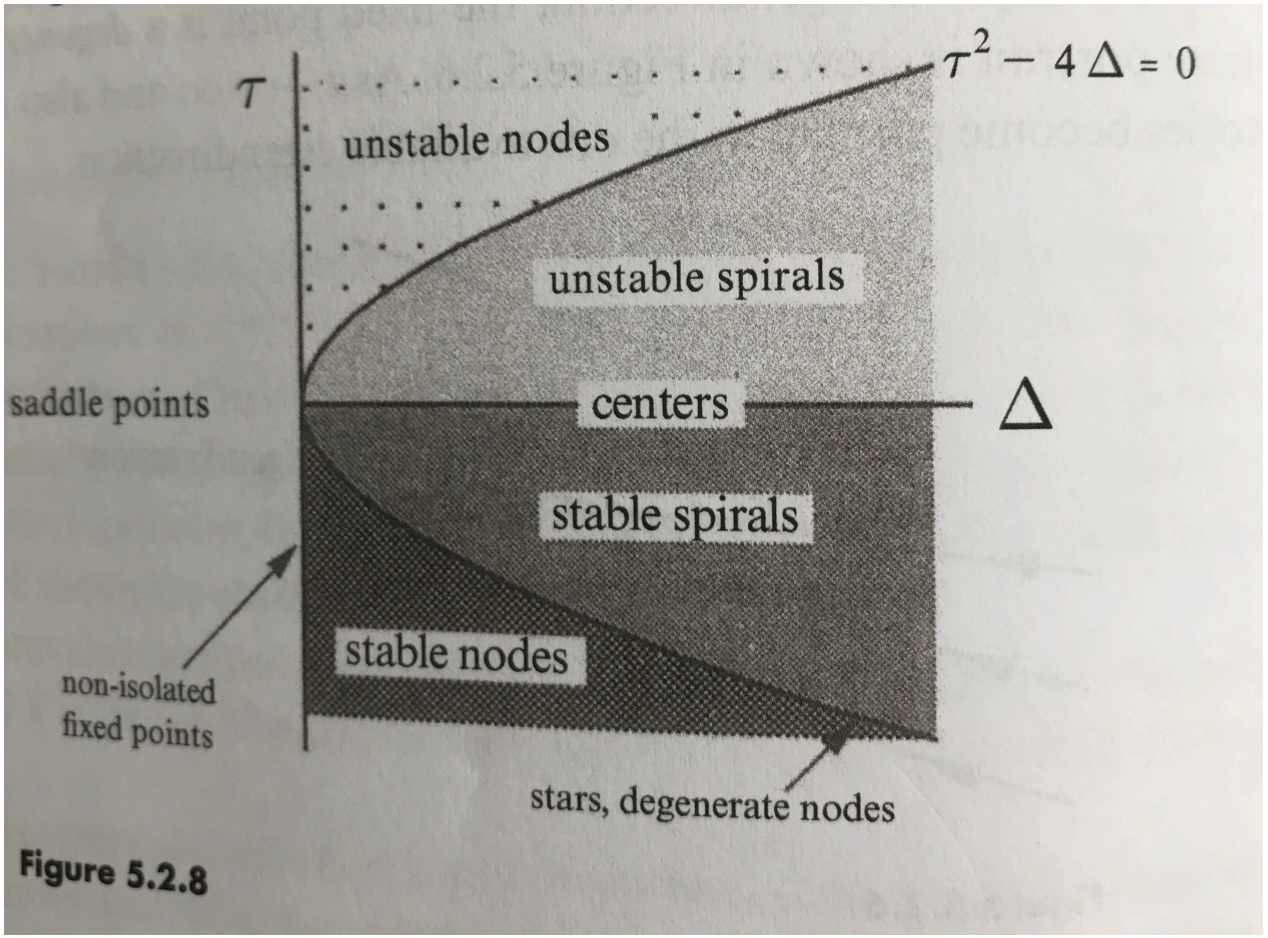
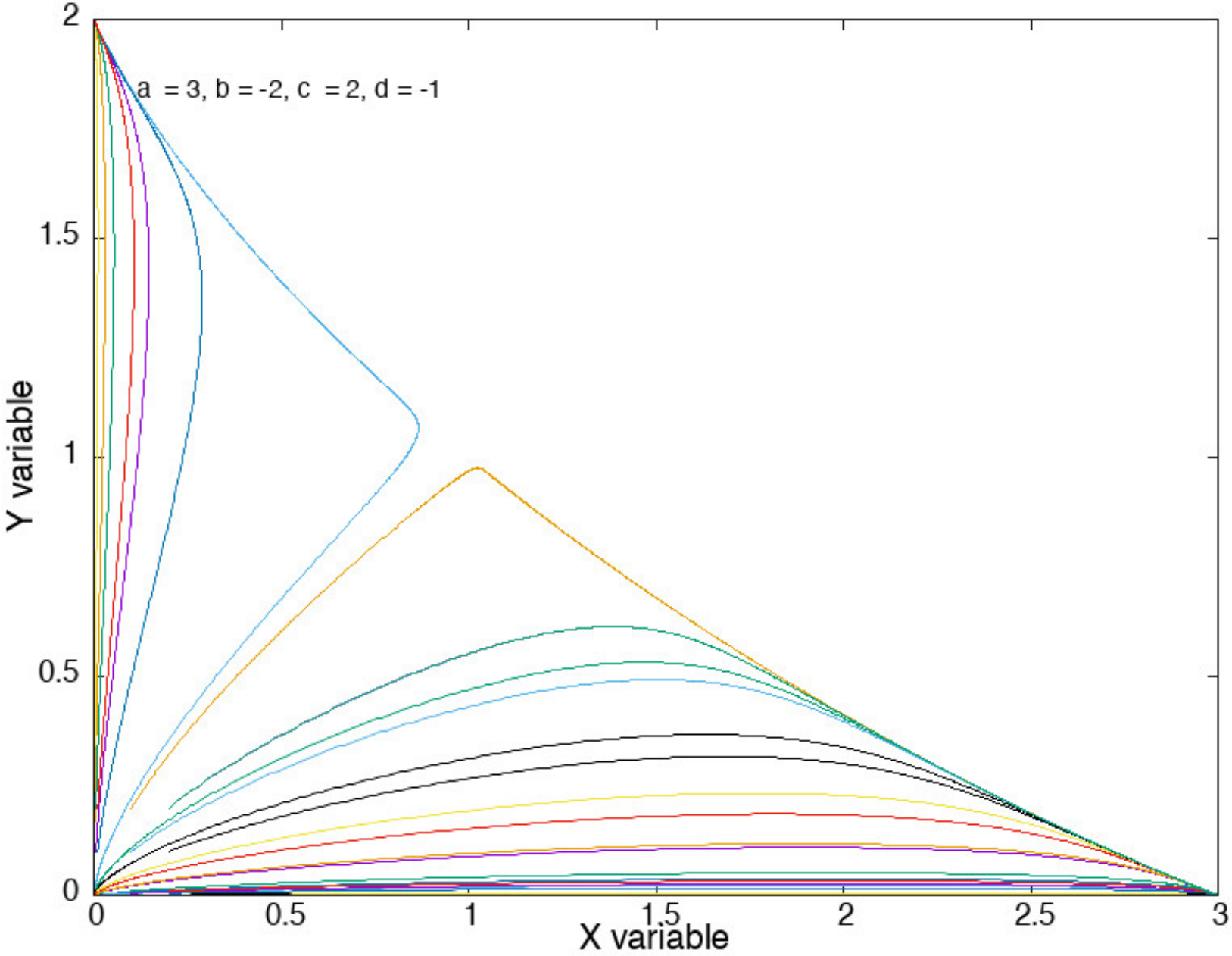


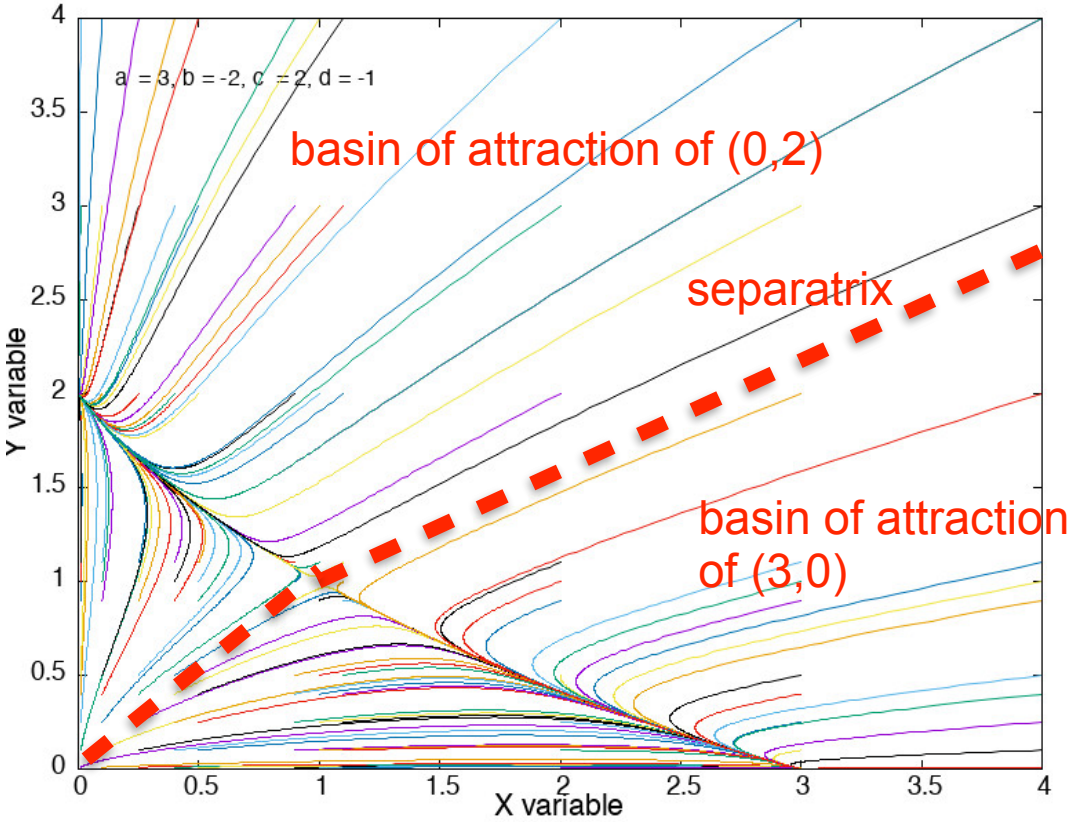
Figure 5.2.8

How do trajectories leave the unstable node at (0,0)?

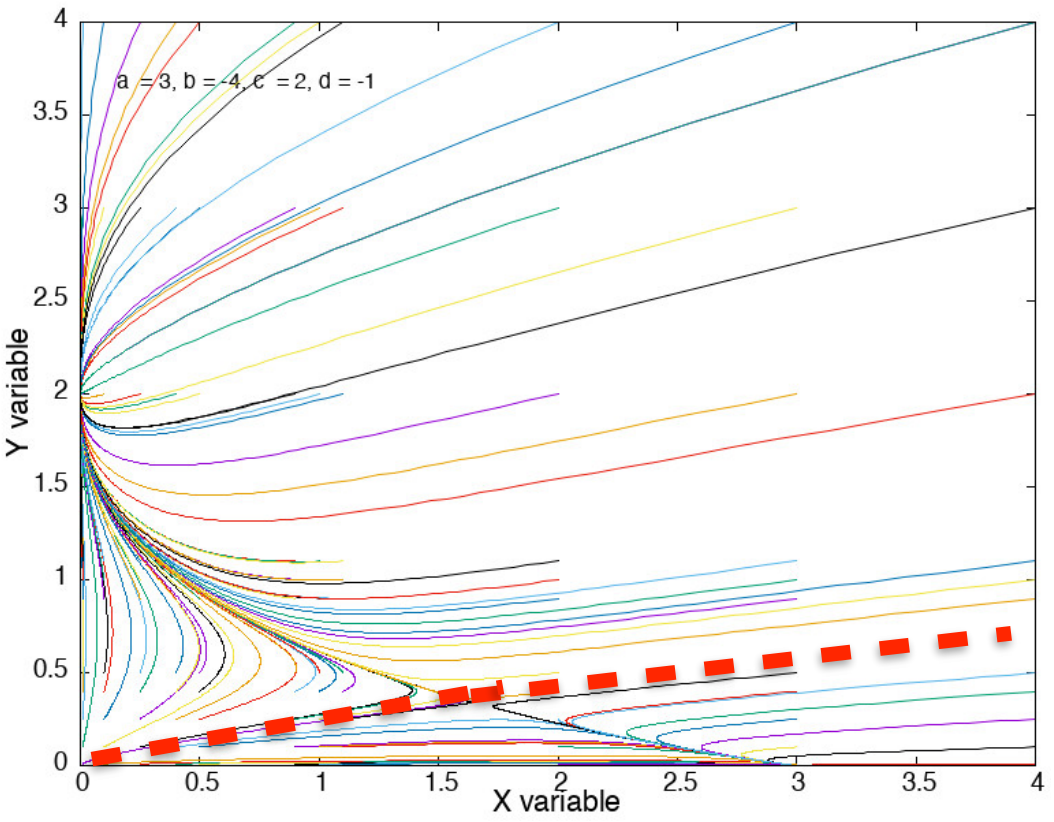


Note the extreme non-linearity!

Phase Portrait: dx/dt = x(3-x-by), dy/dt = y(2 - x - y)



b = 2



b = 4

As competition from sheep (b) increases, the boundary between the region of the phase portrait where the sheep dominate (the stable manifold of the saddle point at 1,1) moves towards the X axis, enlarging the region where sheep dominate and rabbits go extinct (fixed point 0,2).

Recipe for solving 2D non-linear problems:

$$dx/dt = f(x, y)$$
$$dy/dt = g(x, y)$$

1) Locate the FPs of the system (if any) from $f(x,y) = g(x,y) = 0$.

2) Do a 2D Taylor expansion of the functions f(x, y) and g(x, y) to get Jacobian:

$$J = \begin{pmatrix} df/dx & df/dy \\ dg/dx & dg/dy \end{pmatrix}$$

Apply the linear recipe ($d\mathbf{X}/dt = \mathbf{J}\,\mathbf{X}$) at each fixed point (x^*, y^*), using Tr J and det J to classify each FP, and find its eigenvalues/eigenvectors.

3) If eigenvalues for an FP are complex, there is a centre or spiral, where a trajectory rotates about the FP.

4) Find the nullclines, and connect trajectories between the FPs using common sense.

NOTE. Unlike the linear case, eigenvectors and nullclines are curves not straight lines, and the linearised solution only determines the trajectories close to the fixed points.

Tricky points

- Eigenvectors are only valid (i.e., linear) close to a fixed point in a nonlinear 2D system, not far away
- Eigenvectors / nullclines **do not always coincide with axes** in linear or non-linear problems
- A nonlinear dynamical system can often be treated as a set of almost-independent linear systems that have been linearised around each fixed point
- Population models (and concentrations) must be positive or zero, they exist only in the first quadrant; don’t analyse fixed points in the other quadrants in an answer.
- But it can be useful to draw trajectories across the axes to see how they flow around a fixed point: just make clear that only the first quadrant is discussed/calculated.